TEST REPORT

Test Report No. : UL-RPT-RP10407435JD04A V2.0

Manufacturer	:	Apple Inc.
Model No.	:	A1601
FCC ID	:	BCGA1601
Technology	:	WLAN
Test Standard(s)	:	FCC Parts 15.207, 15.209(a) & 15.407

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 14 September 2014

Checked by:

Sarah Williams
Engineer, Radio Laboratory

Issued by :

pp
John Newell
Quality Manager,
UL VS LTD

0644

This laboratory is accredited by UKAS. The tests reported herein have been performed in accordance with its' terms of accreditation.

UL VS LTD

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1. Customer Information

Company Name:	Apple Inc.
Address:	1 Infinite Loop Cupertino, CA 95014 U.S.A

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.407 and 47CFR15.403
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	10 August 2014 to 20 August 2014

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.207	Transmitter AC Conducted Emissions	✓
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth	✓
Part 15.407(e)	Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band)	✓
Part 15.35(c)	Transmitter Duty Cycle	Note 1
Part 15.407(a)(1)(iv)	Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band)	✓
Part 15.407(a)(2)	Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands)	✓
Part 15.407(a)(3)	Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band)	✓
Part 15.407(a)(1)(iv)	Transmitter Peak Power Spectral Density (5.15-5.25 GHz band)	✓
Part 15.407(a)(2)	Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)	✓
Part 15.407(a)(3)	Transmitter Peak Power Spectral Density (5.725-5.85 GHz band)	✓
Part 15.407(b)/ 15.209(a)	Transmitter Out of Band Radiated Emissions	✓
Part 15.407(b)/ 15.209(a)	Transmitter Band Edge Radiated Emissions	✓
Part 15.407(g)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Note 2
Part 15.407(h)(1)	Transmitter Power Control	Note 3
Key to Results ✓ = Complied ✗ = Did not comply		

Note(s):

1. The measurement was performed to assist in the calculation of the level of average output power, power spectral density, peak excursion and emissions as the EUT employs pulsed operation.
2. Frequency stability is better than 20 ppm which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.
3. Transmit Power Control was not tested as the maximum EIRP is less than 500 mW (27 dBm).

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
Reference:	KDB 789033 D02 General UNII Test Procedures New Rules v01 June 6, 2014
Title:	Guidelines for Compliance Testing of Unlicensed National Inforamtion Infrastructure (U-NII) Devices – Part 15, Subpart E
Reference:	KDB662911 D01 Multiple Transmitter Output v02r01 October 31, 2013
Title:	Emissions Testing of Transmitter with Multiple Outputs in the Same Band

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 specifications identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Apple
Model Name or Number:	A1601
Test Sample IMEI:	352025060501666 *(Radiated sample)*
Hardware Version Number:	REV 1.0
Software Version Number:	iOS 12A314 BB:3.08.08
FCC ID:	BCGA1601

Brand Name:	Apple
Model Name or Number:	A1601
Test Sample IMEI:	352025060506475 *(Conducted sample)*
Hardware Version Number:	REV 1.0
Software Version Number:	iOS 12A314 BB:3.08.08
FCC ID:	BCGA1601

3.2. Description of EUT

The Equipment Under Test was a tablet with GSM/GPRS/EGPRS/UMTS and LTE. It also supports IEEE 802.11 a/b/g/n (MIMO 2x2) and Bluetooth®. The rechargeable battery is not user accessible.

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 802.11a,n) / U-NII			
Type of Unit:	Transceiver			
Modulation:	BPSK, QPSK, 16QAM & 64QAM			
Data rates:	802.11a	6, 9, 12, 18, 24, 36 ,48 & 54 Mbps		
	802.11n HT20 (SISO)	MCS0 to MCS7		
	802.11n HT20 (MIMO)	MCS0 to MCS15 (CDD MCS0 to MCS7)		
	802.11n HT40 (SISO)	MCS0 to MCS7		
	802.11n HT40 (MIMO)	MCS0 to MCS15 (CDD MCS0 to MCS7)		
Power Supply Requirement(s):	Nominal	3.8 VDC via 120 VAC 60 Hz adaptor		
Antenna Gains:	**Frequency (GHz)**	**ANT1**	**ANT2**	**Directional Gain**
	5.15 to 5.25	0.0 dBi	3.1 dBi	4.7 dBi
	5.25 to 5.35	0.8 dBi	3.3 dBi	5.1 dBi
	5.47 to 5.725	2.4 dBi	4.3 dBi	6.4 dBi
	5.725 to 5.85	2.7 dBi	3.8 dBi	6.3 dBi
Maximum Conducted Output Power:	20 MHz	17.8 dBm		
	40 MHz	16.4 dBm		
Channel Spacing:	20 MHz			
Transmit Frequency Band:	5150 MHz to 5250 MHz			
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**	
	Bottom	36	5180	
	Middle	40	5200	
	Top	48	5240	
Transmit Frequency Band:	5250 MHz to 5350 MHz			
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**	
	Bottom	52	5260	
	Middle	60	5300	
	Top	64	5320	

Additional Information Related to Testing (continued)

Transmit Frequency Band:	5470 MHz to 5725 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	100	5500
	Middle	116	5580
	Top	140	5700
Transmit Frequency Band:	5725 MHz to 5850 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	149	5745
	Middle	157	5785
	Top	165	5825
Channel Spacing:	40 MHz		
Transmit Frequency Band:	5150 MHz to 5250 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	38	5190
	Top	46	5230
Transmit Frequency Band:	5250 MHz to 5350 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	54	5270
	Top	62	5310
Transmit Frequency Band:	5470 MHz to 5725 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	102	5510
	Middle	110	5550
	Top	134	5670
Transmit Frequency Band:	5725 MHz to 5850 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	151	5755
	Top	159	5795

3.5. Support Equipment

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

Brand Name:	Dell
Description:	Laptop PC
Model Name or Number:	Latitude E5400
Serial Number:	00788

Brand Name:	Not stated
Description:	USB Diagnostic cable
Model Name or Number:	Not stated
Serial Number:	Not stated

Brand Name:	Apple
Description:	USB Cable
Model Name or Number:	A1480
Serial Number:	Not stated

Brand Name:	Apple
Description:	USB Charger
Model Name or Number:	A1399
Serial Number:	Not stated

Brand Name:	Apple
Description:	PHF
Model Name or Number:	Apple Ear Plugs
Serial Number:	Not stated

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Continuously transmitting with a modulated carrier at maximum power on the bottom, middle and top channels as required using the supported data rates/modulation types.

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 to select the test channels, data rates and modulation schemes as required.
- The customer declared the following data rates to be used for all measurements as:
    - 802.11a – BPSK / 6 Mbps
    - 802.11n HT20 SISO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
    - 802.11n HT20 MIMO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 MIMO – BPSK / 13.5 Mbps / MCS0
- The EUT has two separate antennas which correspond to two separate antenna ports. Port 1 and Port 2 correspond to antenna 1 and antenna 2 respectively.
- For 802.11a the EUT transmits from only 1 antenna, both antennas were investigated and the conducted measurements for Port 1 were found to be worst-case. All conducted measurements were performed on Port 1 only.
- For 802.11n the EUT transmits from both antennas, therefore conducted measurements were performed on both ports.
- For 802.11n SISO radiated measurements, the antenna gain was added to the conducted power measurements and antenna 2 was found to be worst-case. All SISO measurements were performed on antenna 2 only.
- For 802.11n MIMO radiated measurements, the EUT was transmitting from both ports.
- Transmitter spurious emissions and AC conducted tests were performed with the EUT transmitting with a data rate of 6.5 Mbps / MCS0 (802.11n HT20 / MIMO). This was found to be the worst case modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest transmit output power level, it was deemed to be the worst case.
- Transmitter radiated spurious emissions and AC conducted tests were performed with the AC Charger and PHF connected to the EUT as this was found to be the worst case during pre-scans. All the accessories were individually connected and measurements made during the pre-scans to determine the worst case combination.
- The conducted sample with IMEI 352025060506475 was used for 99% bandwidth, minimum 6 dB bandwidth, duty cycle, maximum output power and peak power spectral density tests.
- The radiated sample with IMEI 352025060501666 was used for all other tests.

4.3. Worst case Justification

Table of test reduction and modes covering other modes:

Mode	Covered by
802.11a CDD (2TX)	80211n HT20 MIMO (CDD 2TX)
802.11n HT20 STBC (2TX)	80211n HT20 MIMO (CDD 2TX)
802.11n HT20 SDM (2TX)	80211n HT20 MIMO (CDD 2TX)
802.11n HT40 STBC (2TX)	80211n HT40 MIMO (CDD 2TX)
802.11n HT40 SDM (2TX)	80211n HT40 MIMO (CDD 2TX)

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.

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

5.2. Test Results

5.2.1. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Keith Tucker	**Test Date:**	20 August 2014
Test Sample IMEI:	352025060501666		

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

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	47

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.560	Live	22.8	56.0	33.2	Complied
0.839	Live	24.7	56.0	31.3	Complied
1.374	Live	20.5	56.0	35.5	Complied
2.427	Live	19.6	56.0	36.4	Complied
3.615	Live	20.9	56.0	35.1	Complied
28.442	Live	25.5	60.0	34.5	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.753	Live	21.6	46.0	24.4	Complied
1.761	Live	21.4	46.0	24.6	Complied
3.273	Live	21.3	46.0	24.7	Complied
4.781	Live	19.4	46.0	26.6	Complied
5.789	Live	20.2	50.0	29.8	Complied
28.442	Live	21.8	50.0	28.2	Complied

Transmitter AC Conducted Spurious Emissions (continued)

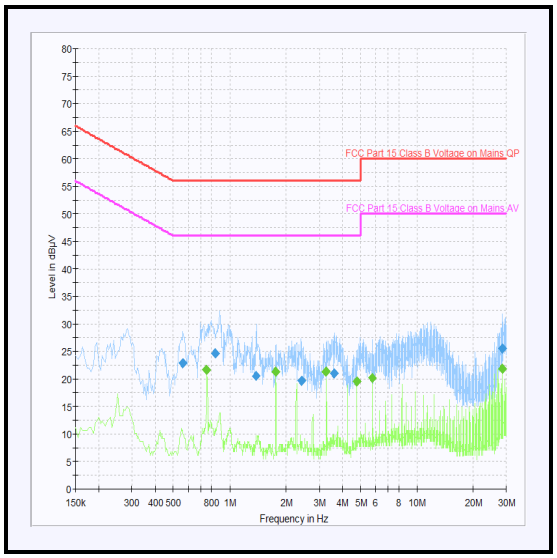
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.276	Neutral	25.8	60.9	35.1	Complied
0.879	Neutral	24.8	56.0	31.2	Complied
1.383	Neutral	19.9	56.0	36.1	Complied
2.405	Neutral	19.0	56.0	37.0	Complied
3.584	Neutral	19.2	56.0	36.8	Complied
6.311	Neutral	16.4	60.0	43.6	Complied

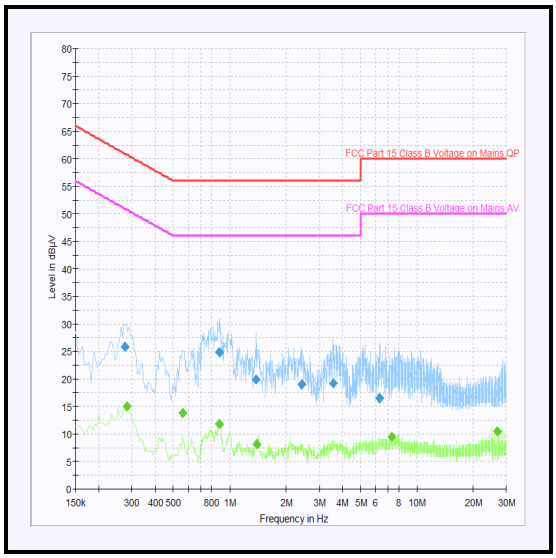
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.281	Neutral	15.0	50.8	35.8	Complied
0.560	Neutral	13.9	46.0	32.1	Complied
0.879	Neutral	11.9	46.0	34.2	Complied
1.392	Neutral	8.1	46.0	37.9	Complied
7.301	Neutral	9.5	50.0	40.5	Complied
26.925	Neutral	10.4	50.0	39.6	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.

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1625	Thermohygrometer	JM Handelspunkt	30.5015.06	None stated	31 Dec 2014	12
A004	LISN	Rohde & Schwarz	ESH3-Z5	890604/027	18 Nov 2014	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	27 Feb 2015	12
M1263	Test Receiver	Rohde & Schwarz	ESIB 7	100265	14 Oct 2014	12

5.2.2. Transmitter 26 dB Emission Bandwidth

Test Summary:

Test Engineers:	Nick Steele & Georgios Vzeras	**Test Dates:**	10 August 2014 to 19 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.403(i)
Test Method Used:	As detailed in KDB 789033 D02 Section II.C.1.

Environmental Conditions:

Temperatures (°C):	23 to 25
Relative Humidity (%):	41 to 45

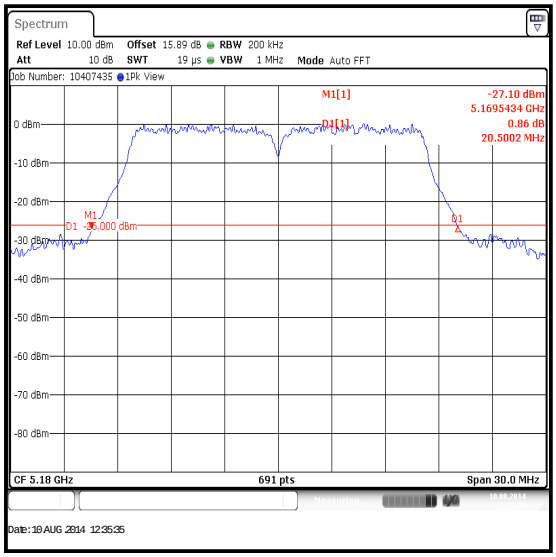
Note(s):

1. The customer declared the following data rates to be used for all measurements as:
    - 802.11a – BPSK / 6 Mbps
    - 802.11n HT20 SISO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
    - 802.11n HT20 MIMO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 MIMO – BPSK / 13.5 Mbps / MCS0
2. Final measurements were performed in each supported operating band using the above configurations on the bottom, middle and top channels in accordance with KDB 789033 Section II.C.1. Emission Bandwidth (EBW) test procedure.
3. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.

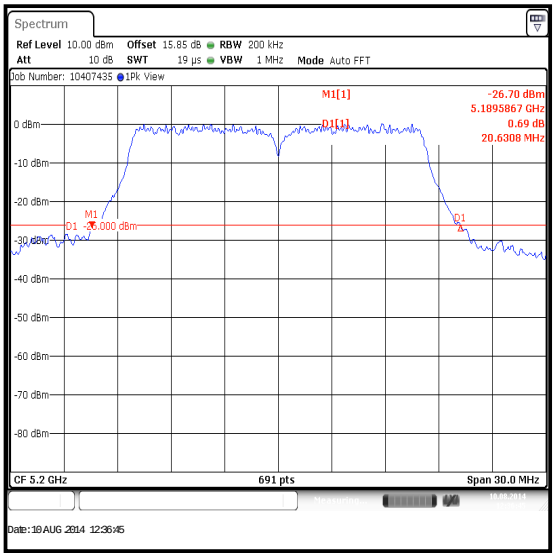
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11a / 20 MHz / 5.15-5.25 GHz band / Port 1

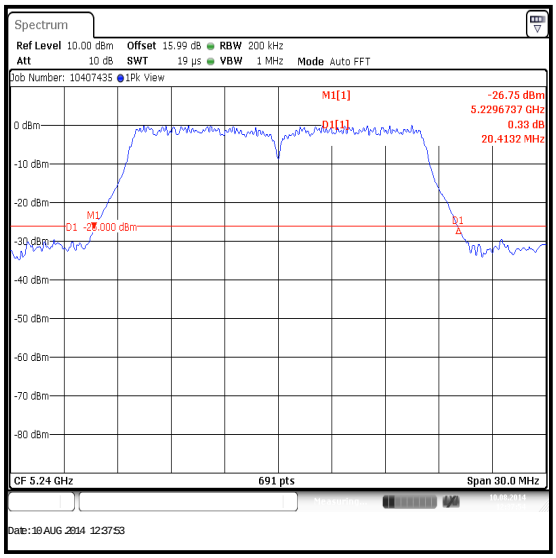
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6	20.500
Middle	5200	BPSK	6	20.631
Top	5240	BPSK	6	20.413



Bottom Channel



Middle Channel

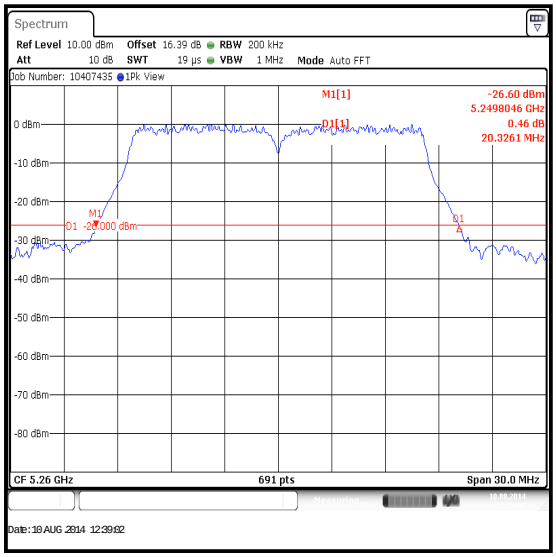


Top Channel

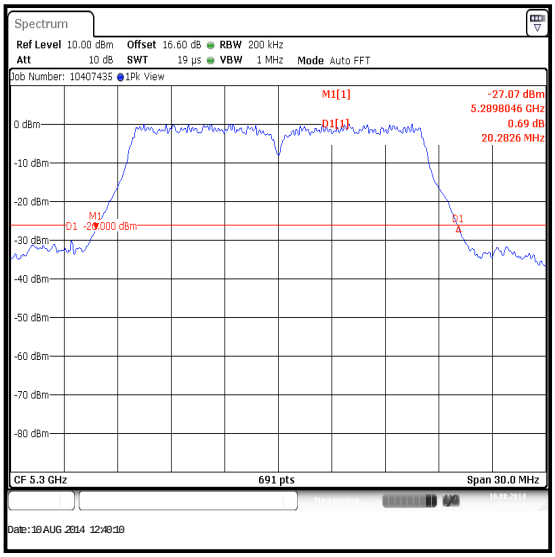
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11a / 20 MHz / 5.25-5.35 GHz band / Port 1

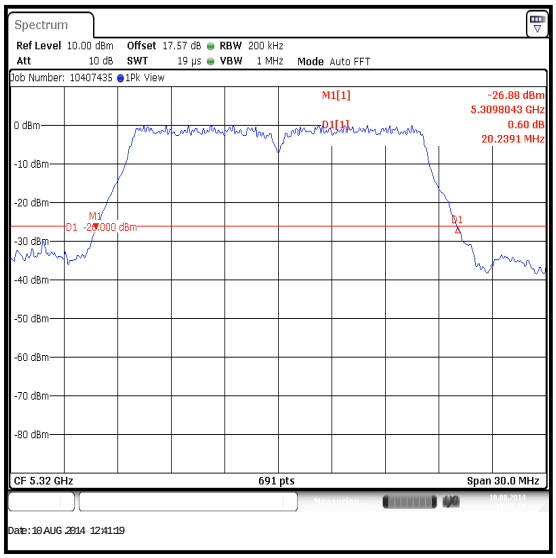
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5260	BPSK	6	20.326
Middle	5300	BPSK	6	20.283
Top	5320	BPSK	6	20.239



Bottom Channel



Middle Channel

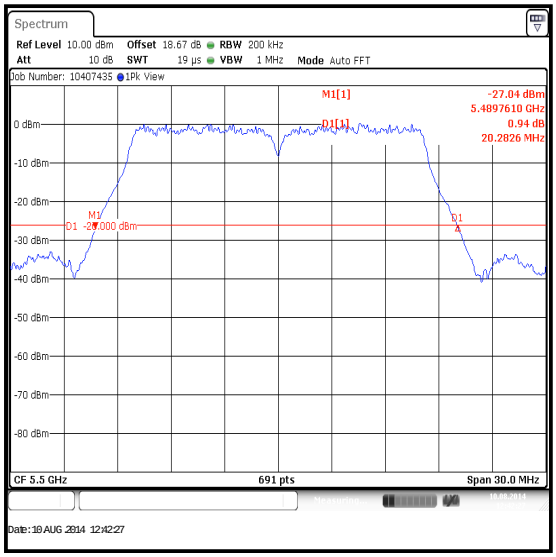


Top Channel

Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11a / 20 MHz / 5.47-5.725 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5500	BPSK	6	20.283
Middle	5580	BPSK	6	20.240
Top	5700	BPSK	6	20.239



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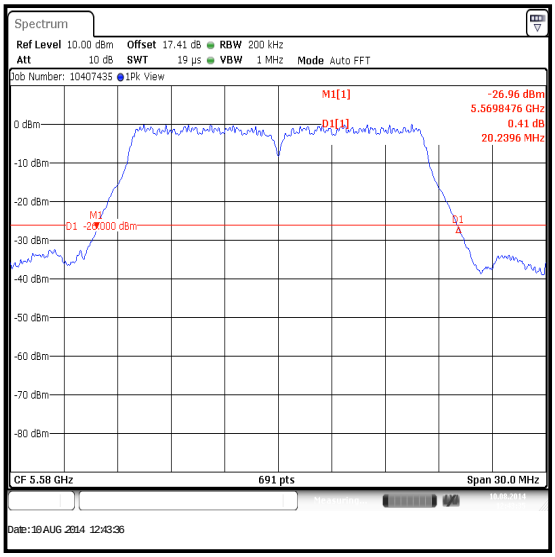
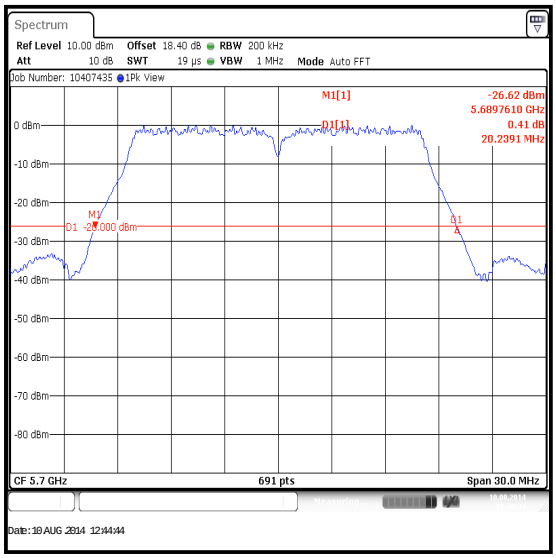


Middle Channel

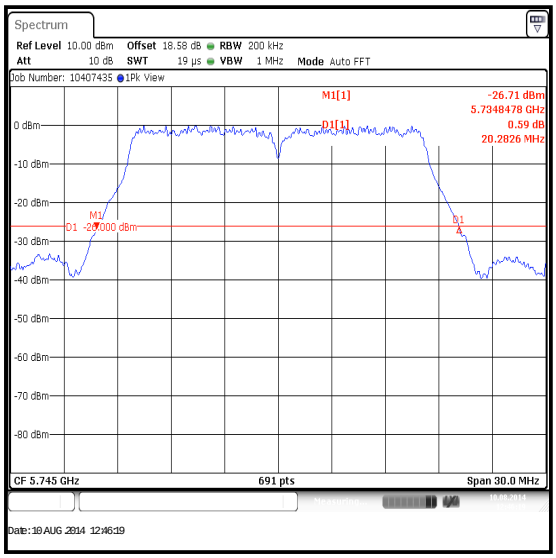


Top Channel

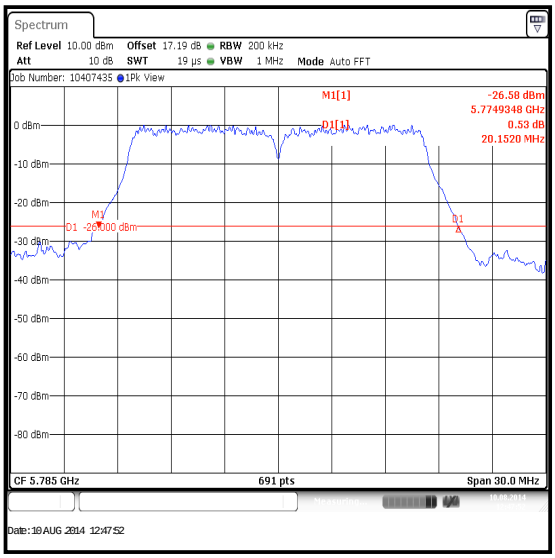
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11a / 20 MHz / 5.725-5.85 GHz band / Port 1

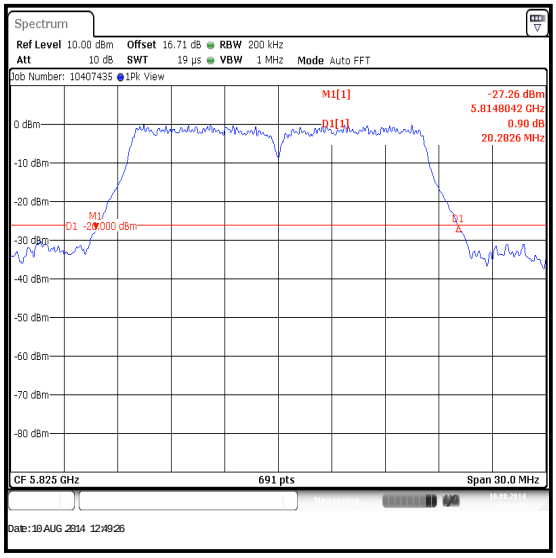
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps	26 dB Emission Bandwidth (MHz)
Bottom	5745	BPSK	6	20.283
Middle	5785	BPSK	6	20.152
Top	5825	BPSK	6	20.283



Bottom Channel



Middle Channel

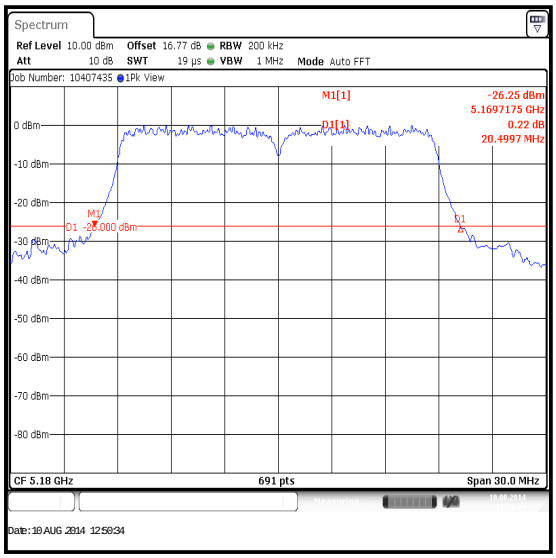


Top Channel

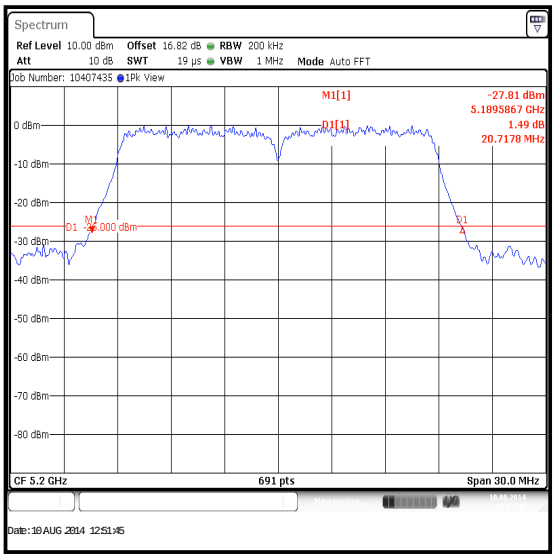
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.15-5.25 GHz band / Port 1

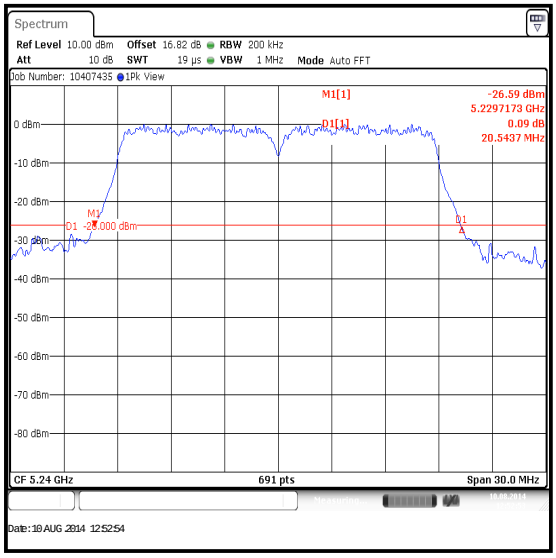
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6.5 / 0	20.500
Middle	5200	BPSK	6.5 / 0	20.718
Top	5240	BPSK	6.5 / 0	20.544



Bottom Channel



Middle Channel

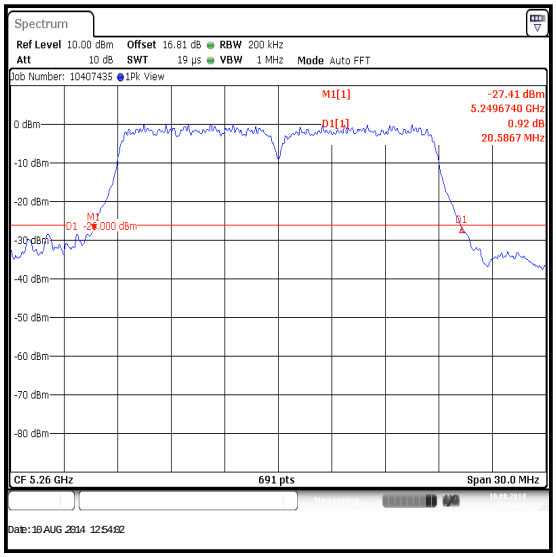


Top Channel

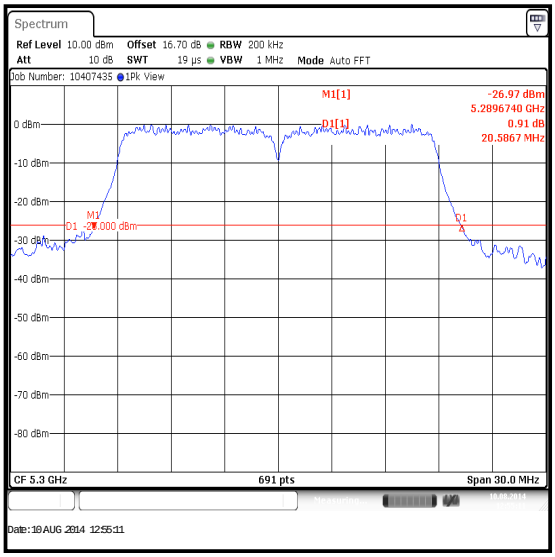
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.25-5.35 GHz band / Port 1

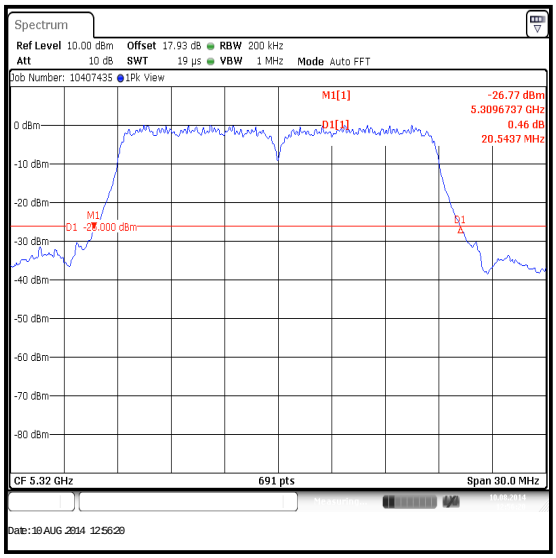
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	BPSK	6.5 / 0	20.587
Middle	5300	BPSK	6.5 / 0	20.587
Top	5320	BPSK	6.5 / 0	20.544



Bottom Channel



Middle Channel

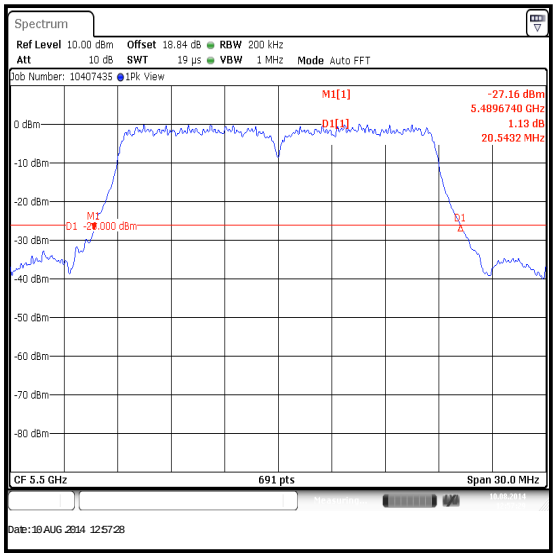


Top Channel

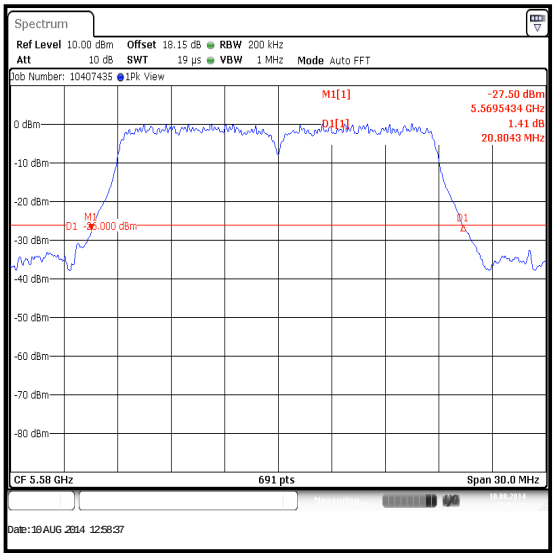
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.47-5.725 GHz band / Port 1

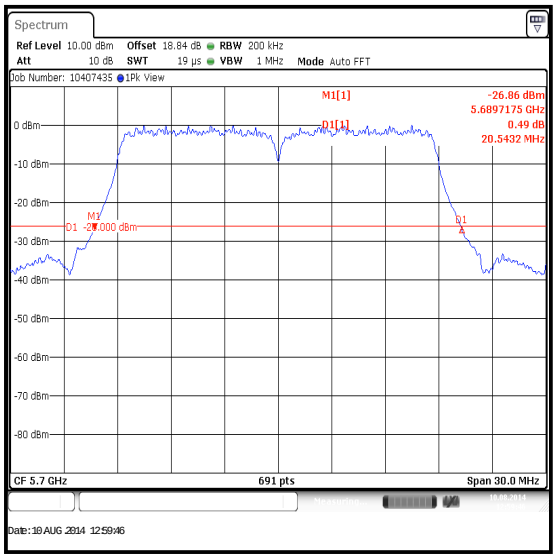
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	BPSK	6.5 / 0	20.543
Middle	5580	BPSK	6.5 / 0	20.804
Top	5700	BPSK	6.5 / 0	20.543



Bottom Channel



Middle Channel

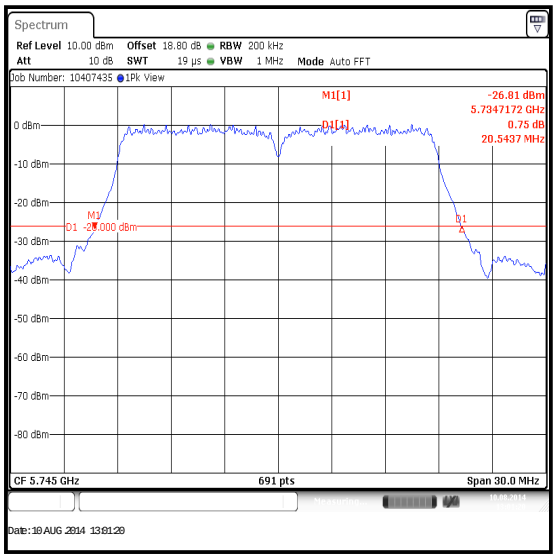


Top Channel

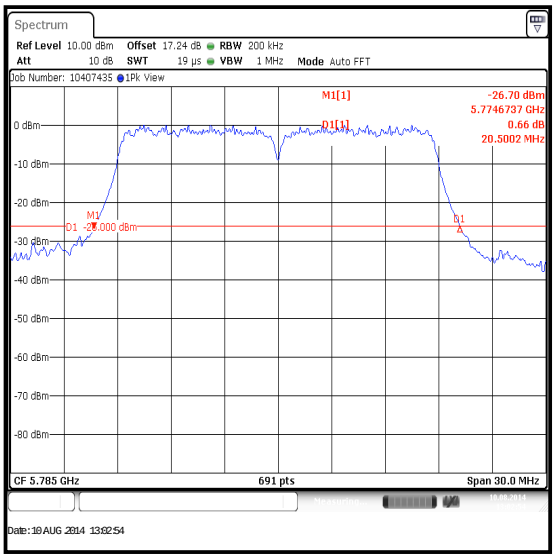
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.725-5.85 GHz band / Port 1

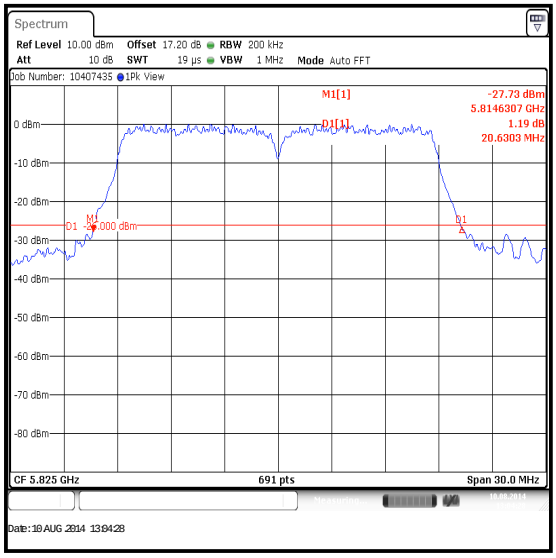
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5745	BPSK	6.5 / 0	20.544
Middle	5785	BPSK	6.5 / 0	20.500
Top	5825	BPSK	6.5 / 0	20.630



Bottom Channel



Middle Channel

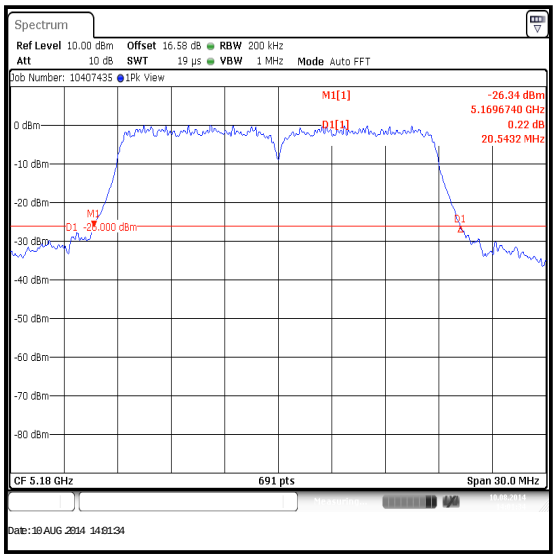


Top Channel

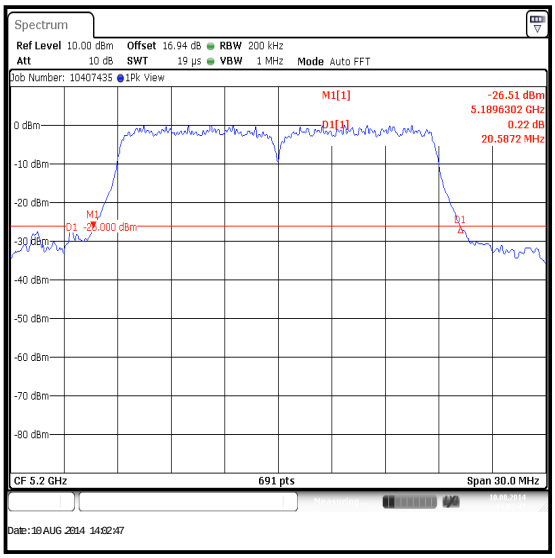
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.15-5.25 GHz band / Port 2

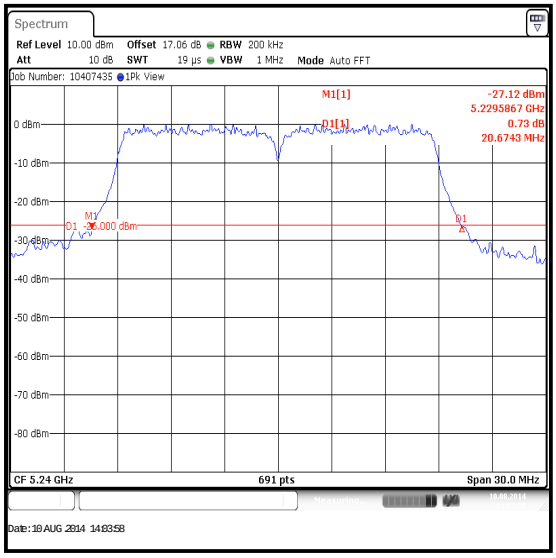
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6.5 / 0	20.543
Middle	5200	BPSK	6.5 / 0	20.587
Top	5240	BPSK	6.5 / 0	20.674



Bottom Channel



Middle Channel

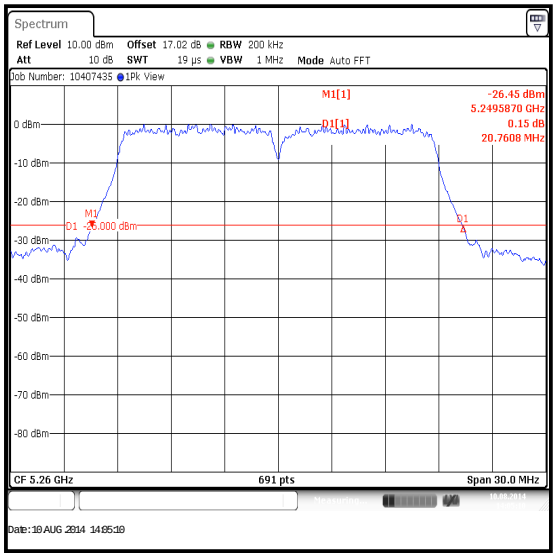


Top Channel

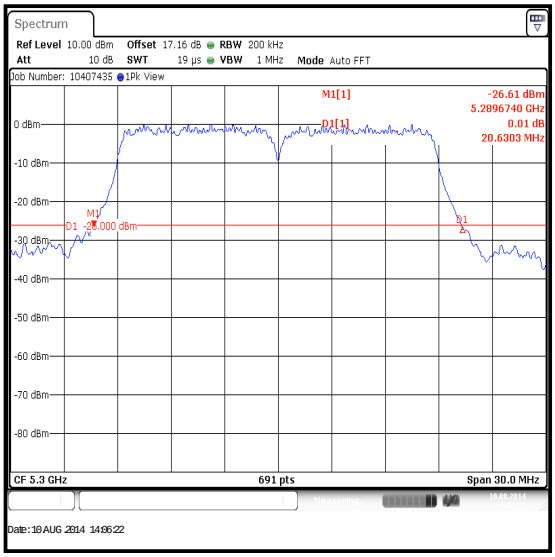
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.25-5.35 GHz band / Port 2

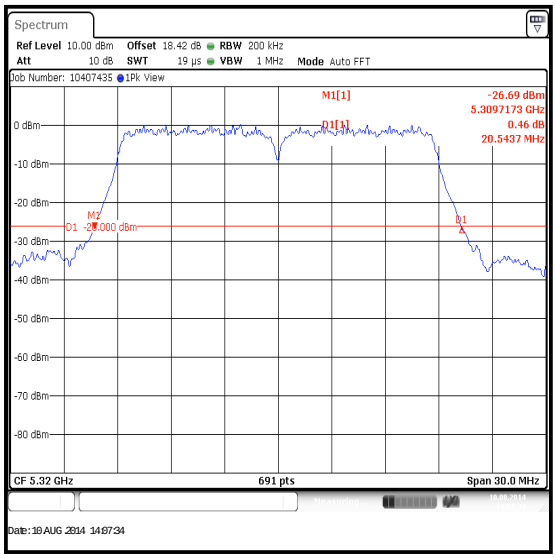
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	BPSK	6.5 / 0	20.761
Middle	5300	BPSK	6.5 / 0	20.630
Top	5320	BPSK	6.5 / 0	20.544



Bottom Channel



Middle Channel

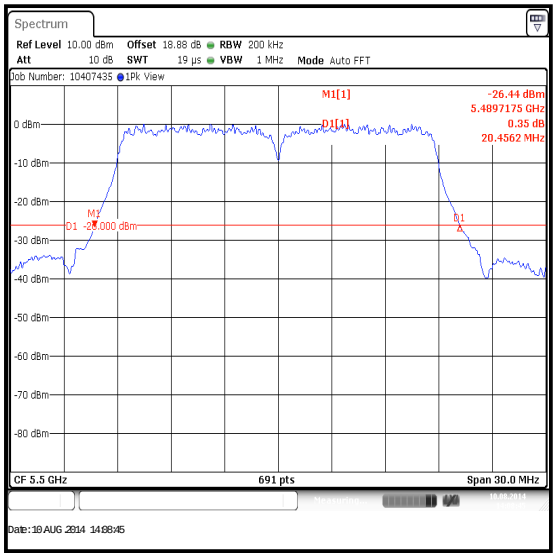


Top Channel

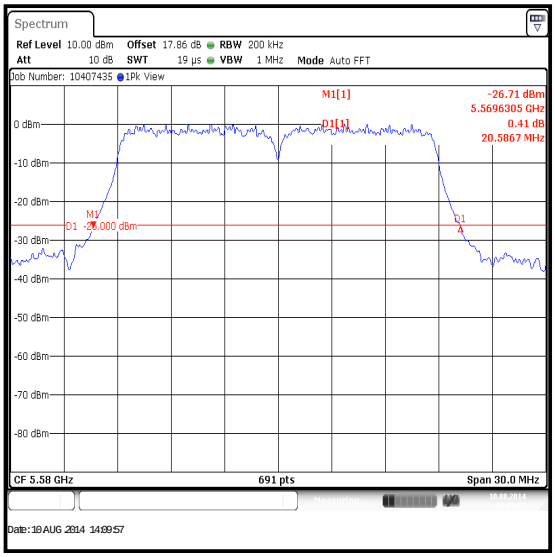
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.47-5.725 GHz band / Port 2

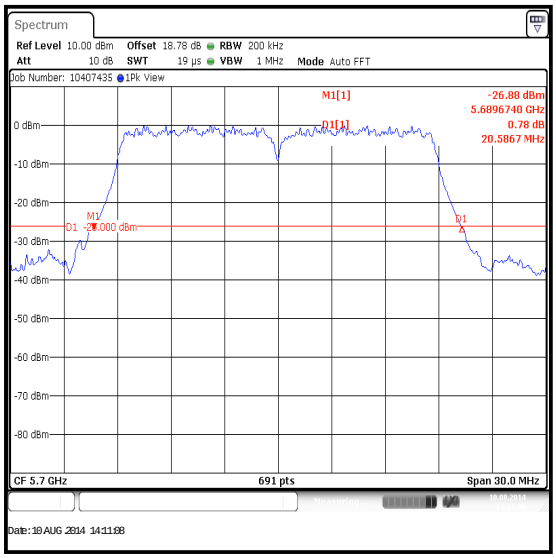
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	BPSK	6.5 / 0	20.456
Middle	5580	BPSK	6.5 / 0	20.587
Top	5700	BPSK	6.5 / 0	20.587



Bottom Channel



Middle Channel

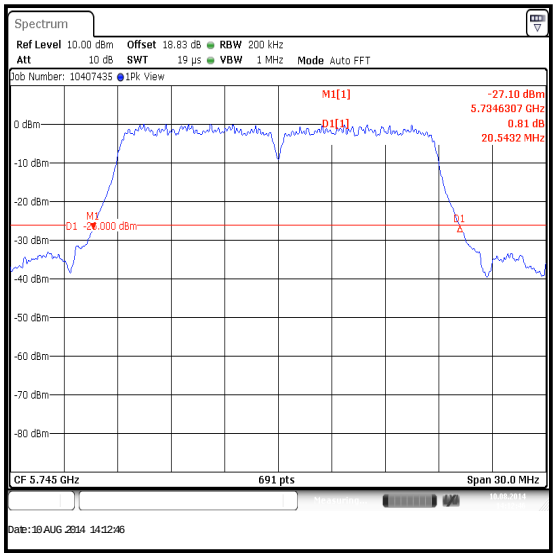


Top Channel

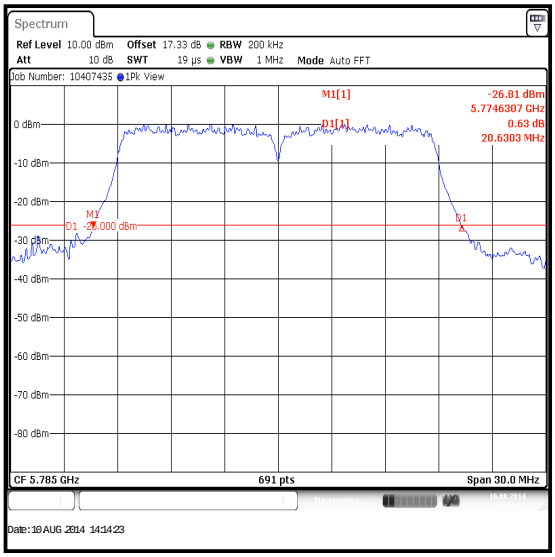
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / SISO / 5.725-5.85 GHz band / Port 2

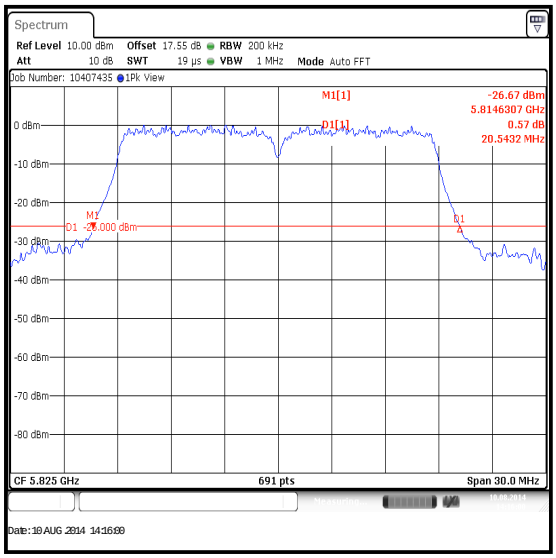
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5745	BPSK	6.5 / 0	20.543
Middle	5785	BPSK	6.5 / 0	20.630
Top	5825	BPSK	6.5 / 0	20.543



Bottom Channel



Middle Channel

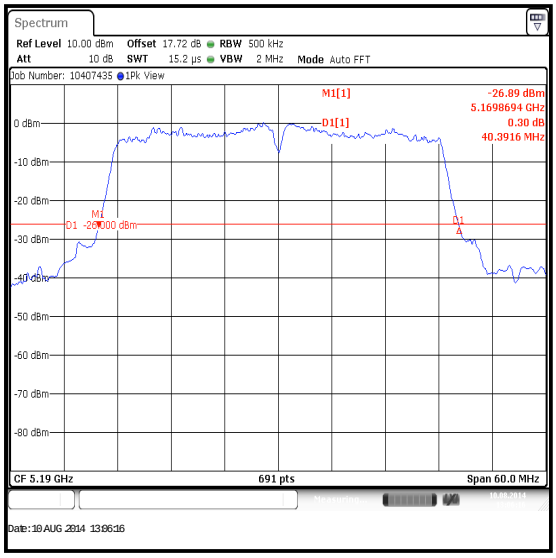


Top Channel

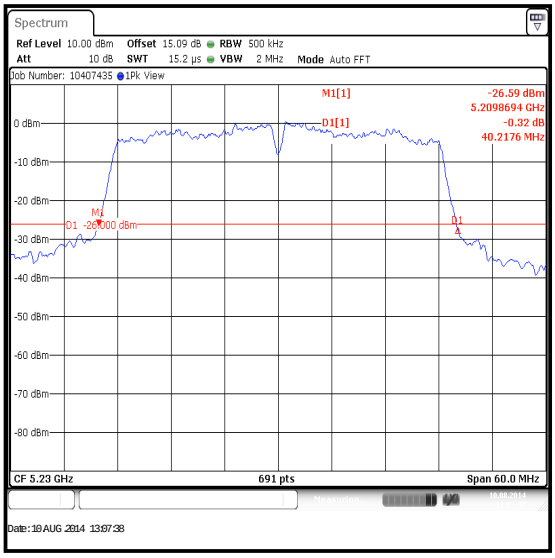
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.15-5.25 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	BPSK	13.5 / 0	40.392
Top	5230	BPSK	13.5 / 0	40.218



Bottom Channel

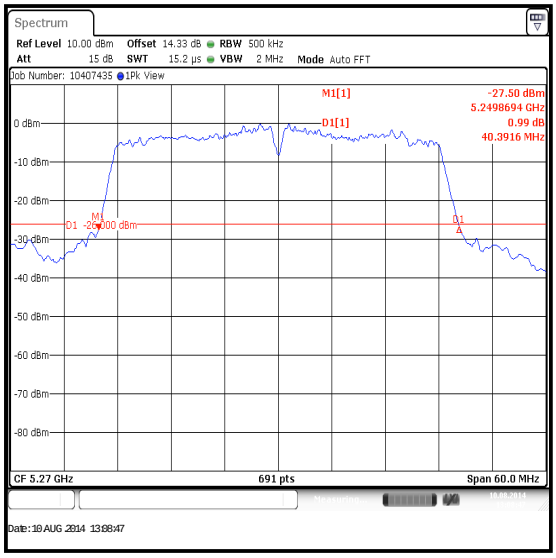


Top Channel

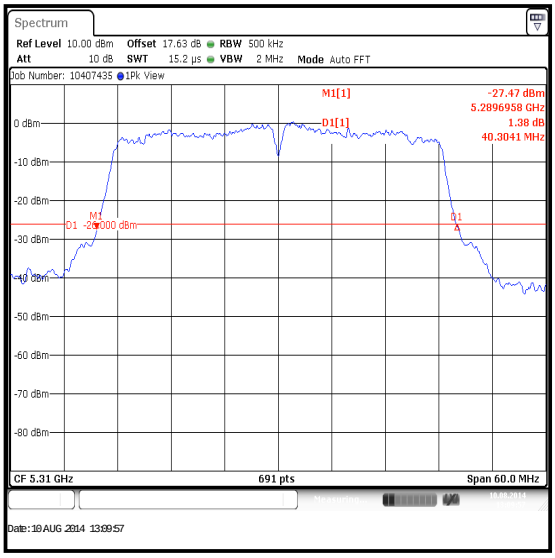
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.25-5.35 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	BPSK	13.5 / 0	40.392
Top	5310	BPSK	13.5 / 0	40.304



Bottom Channel

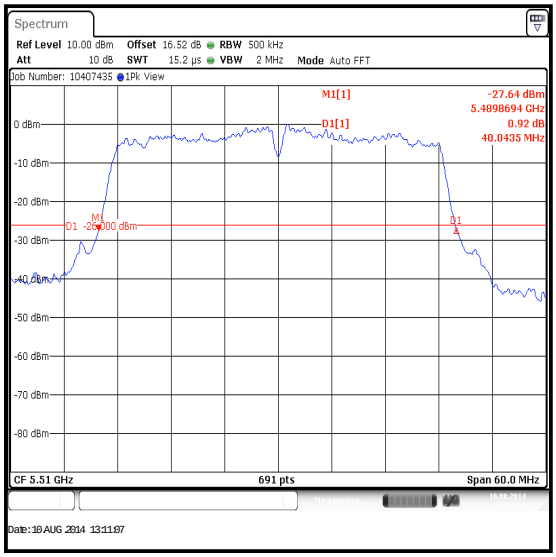


Top Channel

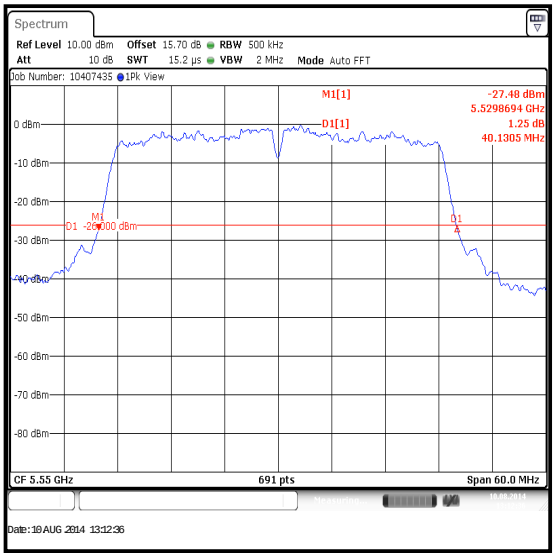
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.47-5.725 GHz band / Port 1

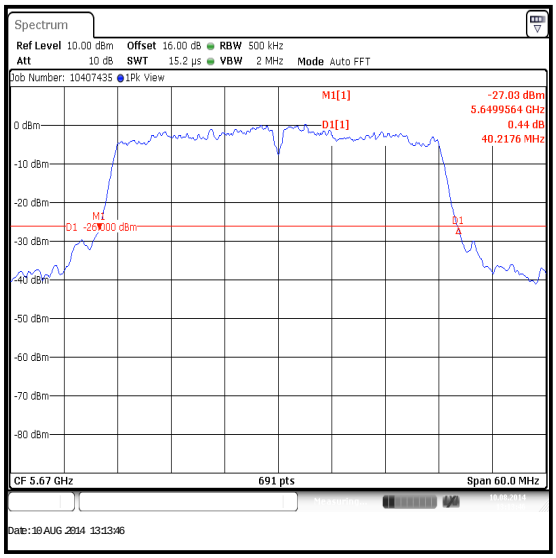
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	BPSK	13.5 / 0	40.043
Middle	5550	BPSK	13.5 / 0	40.131
Top	5670	BPSK	13.5 / 0	40.218



Bottom Channel



Middle Channel

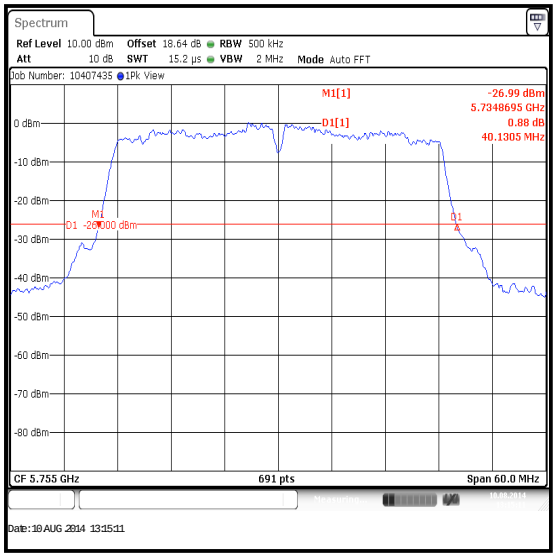


Top Channel

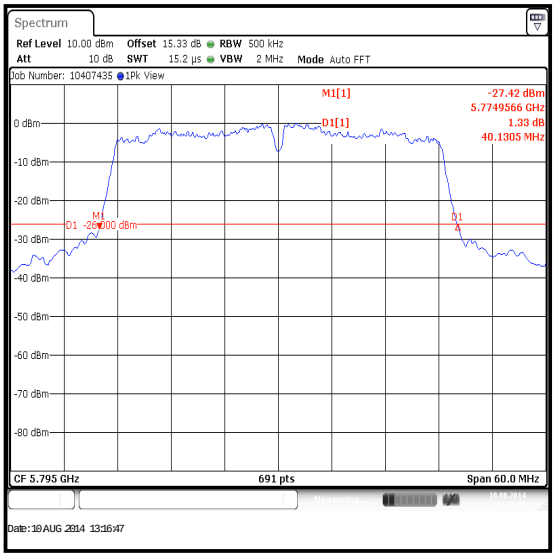
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.725-5.85 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5755	BPSK	13.5 / 0	40.131
Top	5795	BPSK	13.5 / 0	40.131



Bottom Channel

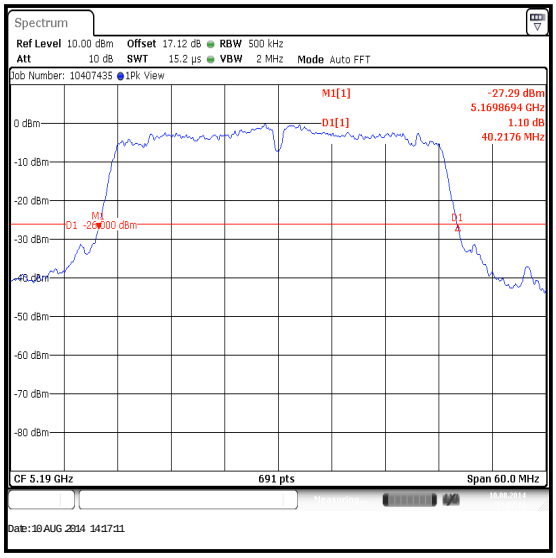


Top Channel

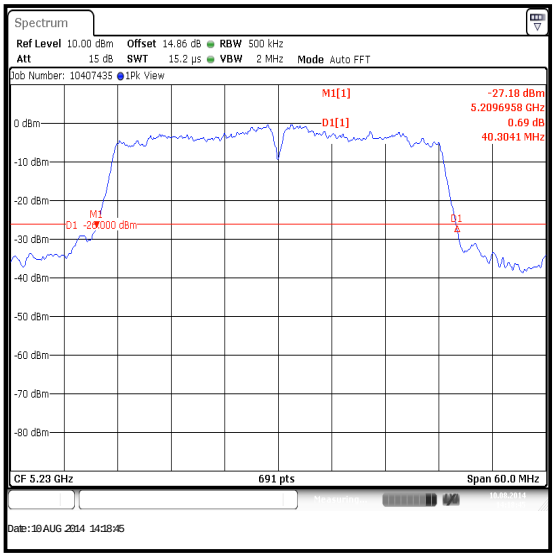
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.15-5.25 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	BPSK	13.5 / 0	40.218
Top	5230	BPSK	13.5 / 0	40.304



Bottom Channel

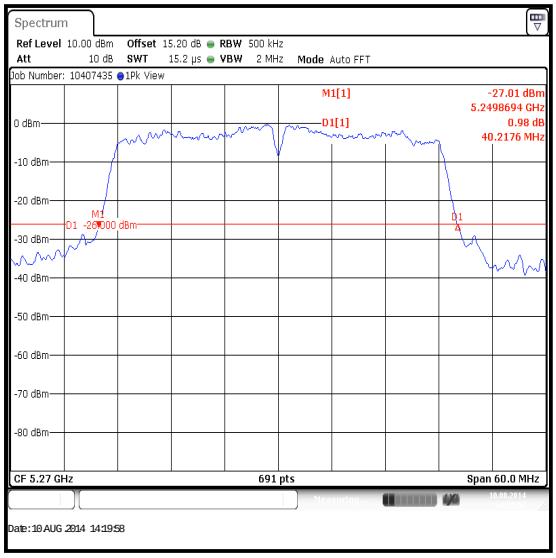


Top Channel

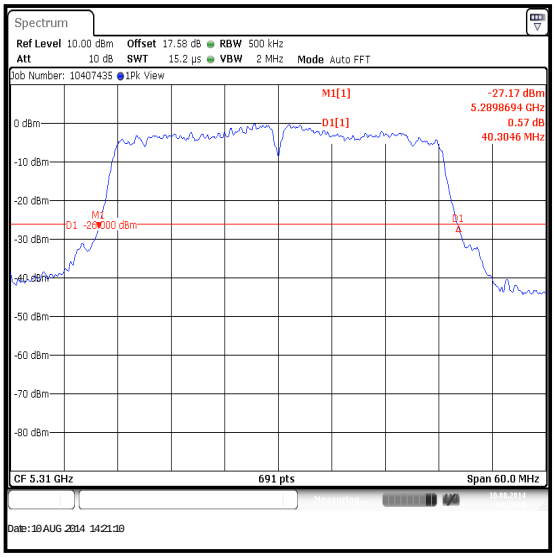
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.25-5.35 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	BPSK	13.5 / 0	40.218
Top	5310	BPSK	13.5 / 0	40.305



Bottom Channel

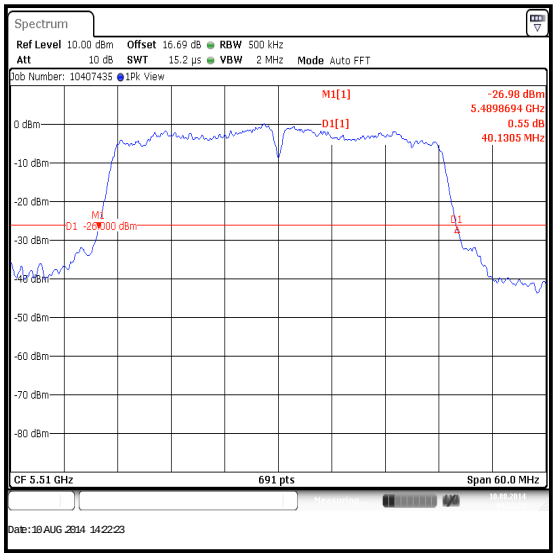


Top Channel

Transmitter 26 dB Emission Bandwidth (continued)

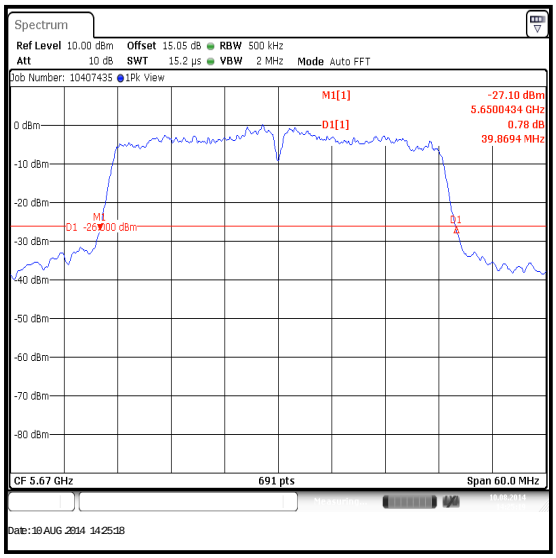
Results: 802.11n / 40 MHz / SISO / 5.47-5.725 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	BPSK	13.5 / 0	40.131
Middle	5550	BPSK	13.5 / 0	40.130
Top	5670	BPSK	13.5 / 0	39.869



Bottom Channel

Middle Channel

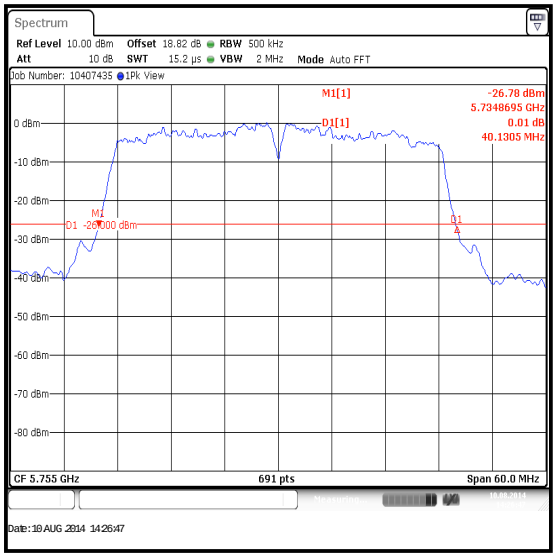


Top Channel

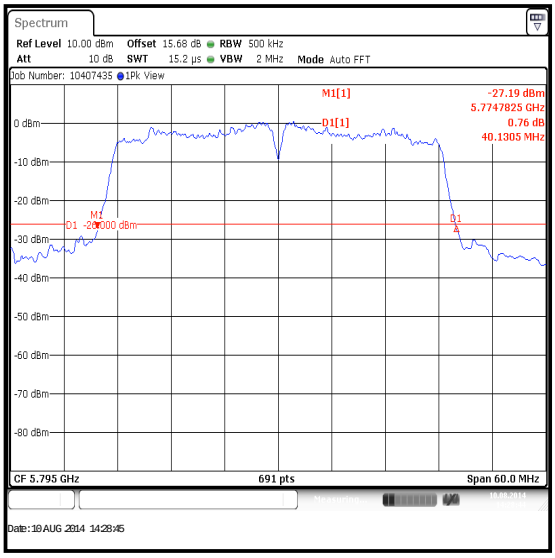
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / SISO / 5.725-5.85 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5755	BPSK	13.5 / 0	40.131
Top	5795	BPSK	13.5 / 0	40.131



Bottom Channel

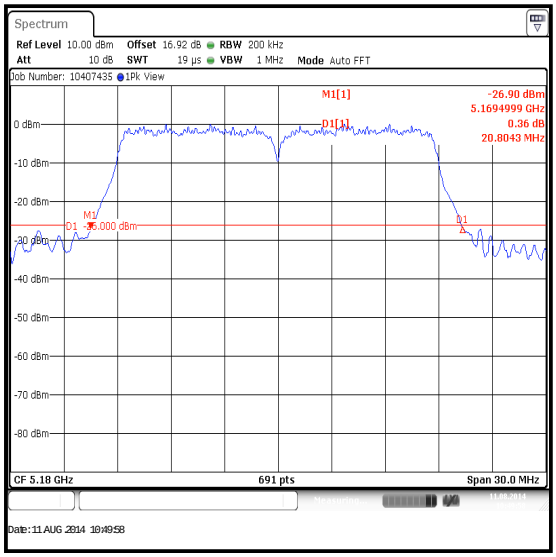


Top Channel

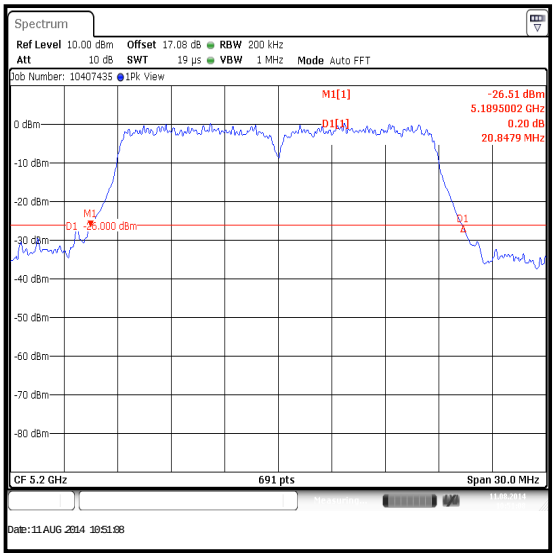
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.15-5.25 GHz band / Port 1

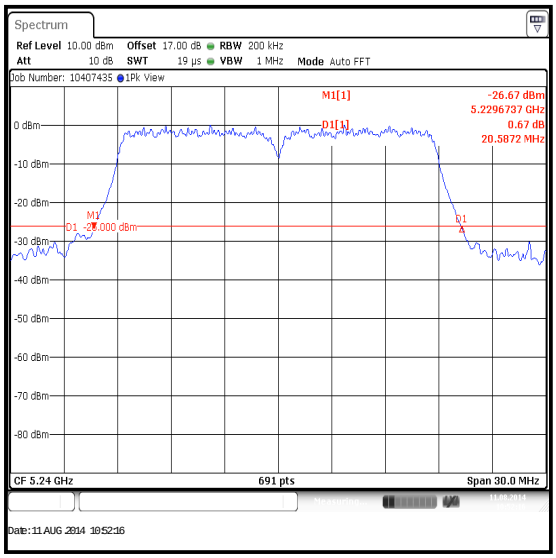
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6.5 / 0	20.804
Middle	5200	BPSK	6.5 / 0	20.848
Top	5240	BPSK	6.5 / 0	20.587



Bottom Channel



Middle Channel

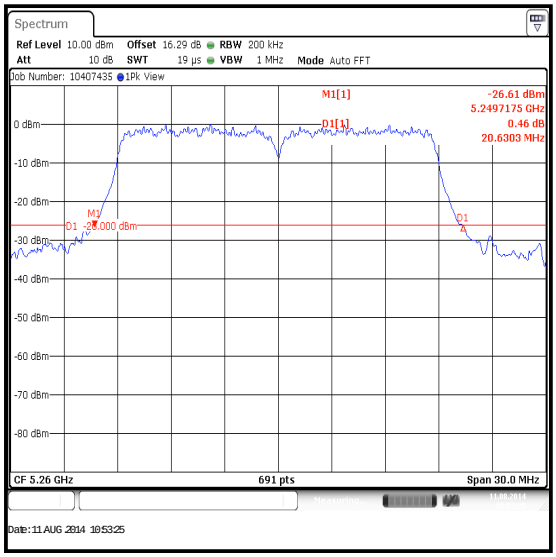


Top Channel

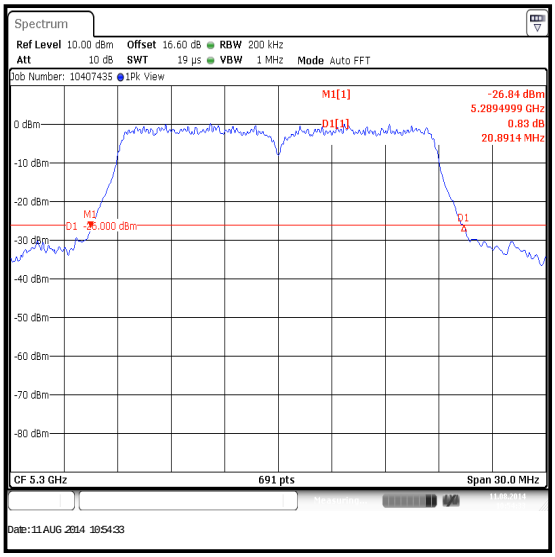
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.25-5.35 GHz band / Port 1

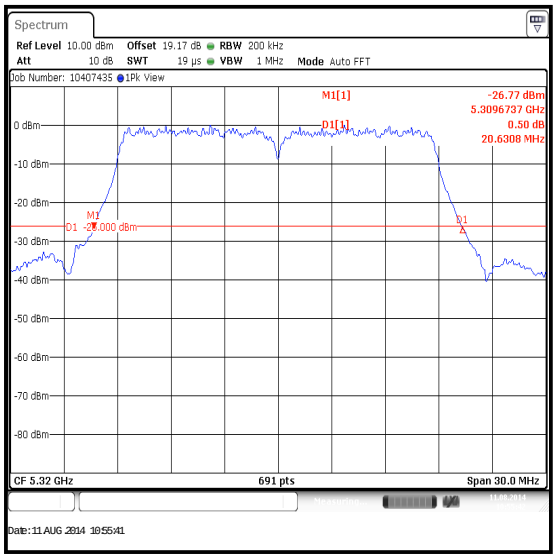
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	BPSK	6.5 / 0	20.630
Middle	5300	BPSK	6.5 / 0	20.891
Top	5320	BPSK	6.5 / 0	20.631



Bottom Channel



Middle Channel

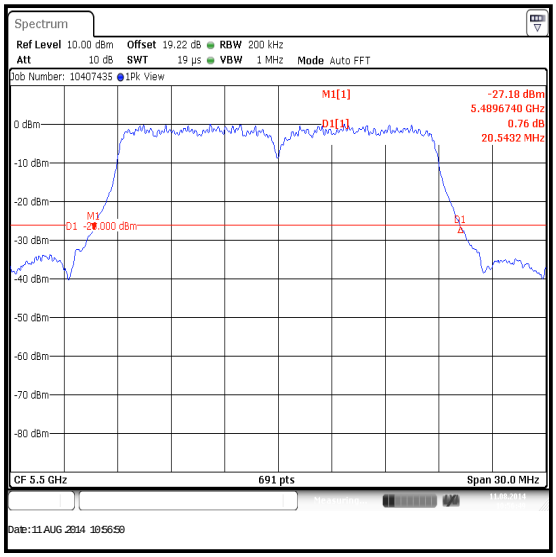


Top Channel

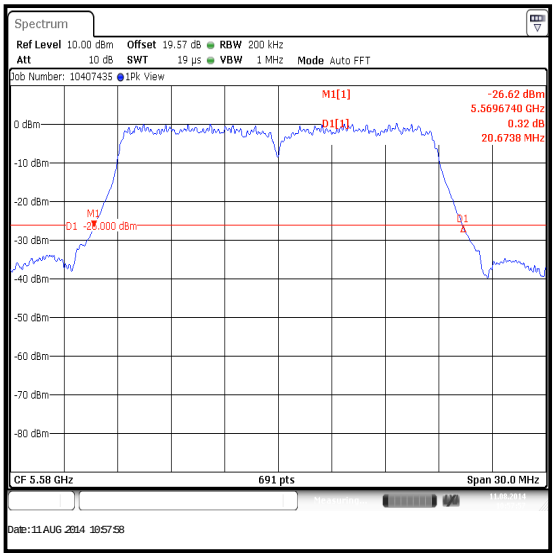
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.47-5.725 GHz band / Port 1

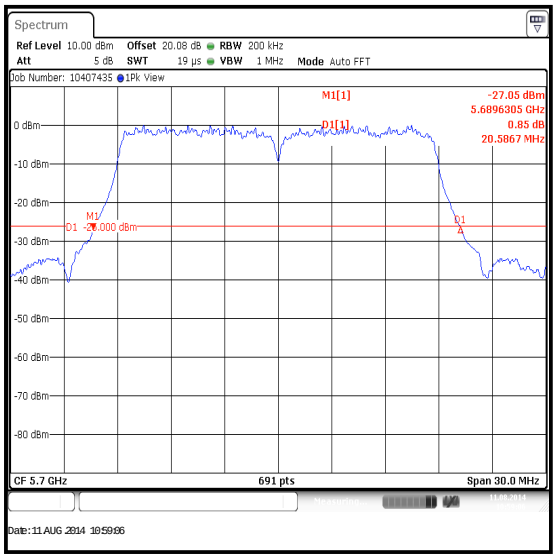
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	BPSK	6.5 / 0	20.543
Middle	5580	BPSK	6.5 / 0	20.674
Top	5700	BPSK	6.5 / 0	20.587



Bottom Channel



Middle Channel

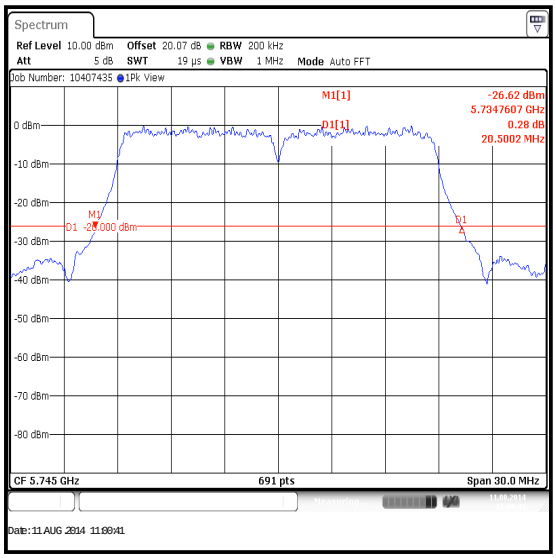


Top Channel

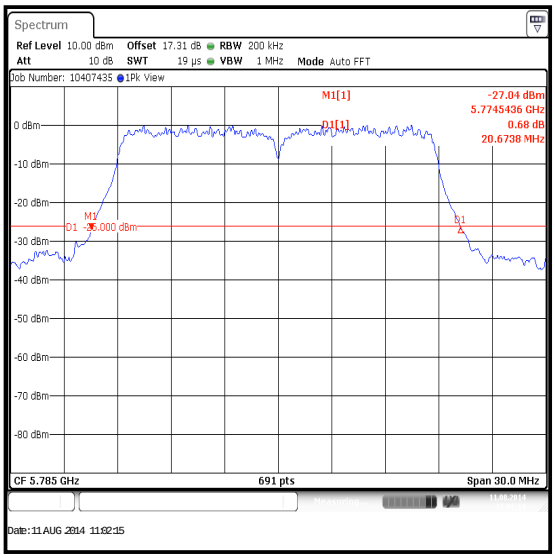
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.725-5.85 GHz band / Port 1

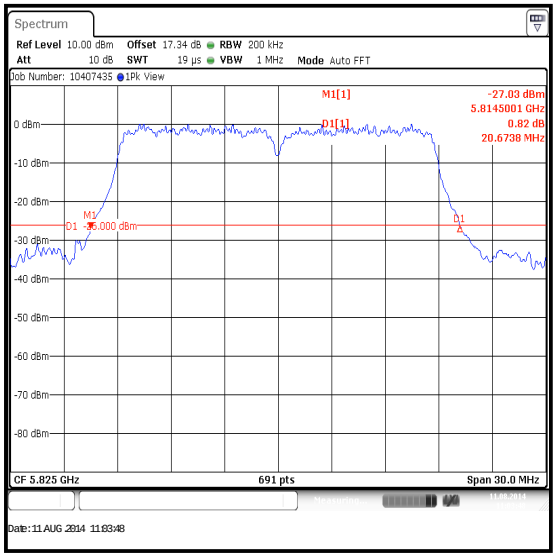
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5745	BPSK	6.5 / 0	20.500
Middle	5785	BPSK	6.5 / 0	20.674
Top	5825	BPSK	6.5 / 0	20.674



Bottom Channel



Middle Channel

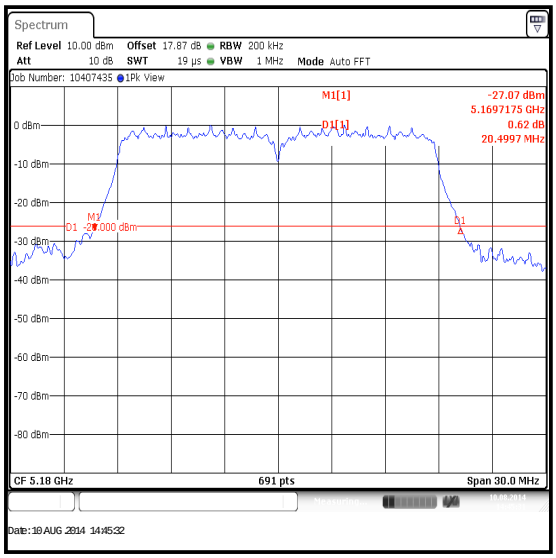


Top Channel

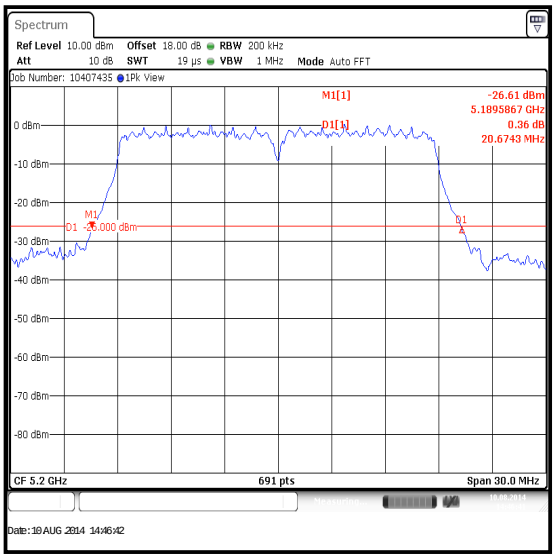
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.15-5.25 GHz band / Port 2

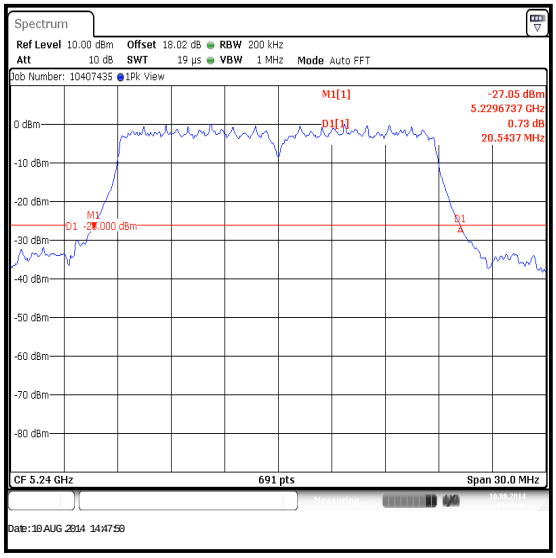
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5180	BPSK	6.5 / 0	20.500
Middle	5200	BPSK	6.5 / 0	20.674
Top	5240	BPSK	6.5 / 0	20.544



Bottom Channel



Middle Channel

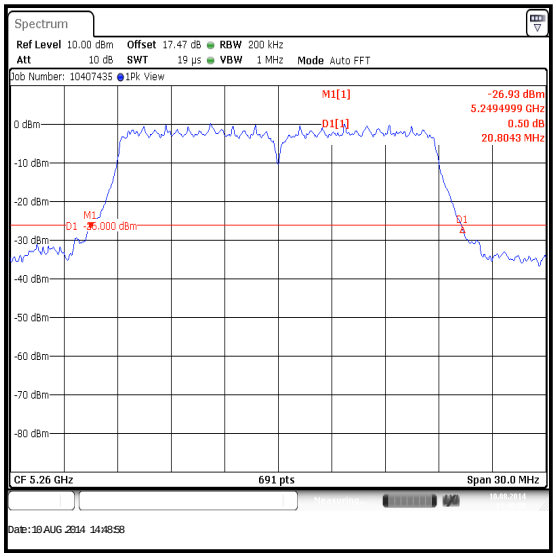


Top Channel

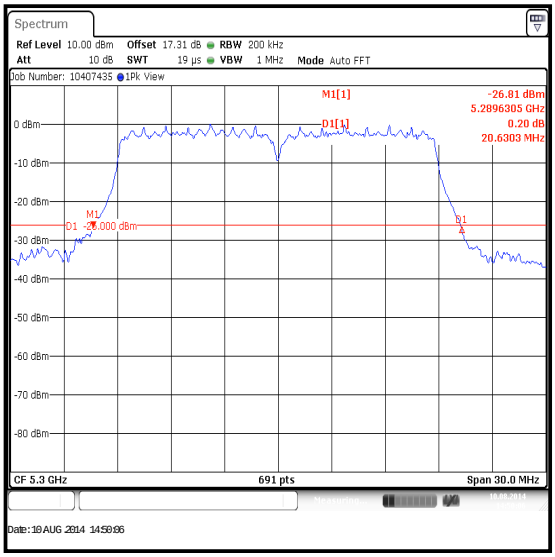
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / 5.25-5.35 GHz band / Port 2 / MIMO Mode

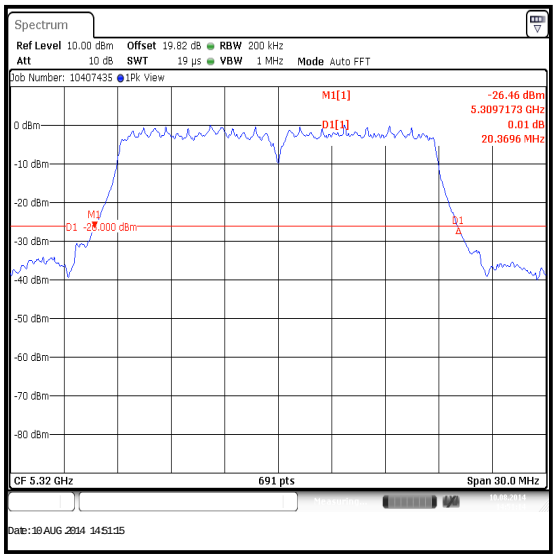
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5260	BPSK	6.5 / 0	20.804
Middle	5300	BPSK	6.5 / 0	20.630
Top	5320	BPSK	6.5 / 0	20.370



Bottom Channel



Middle Channel

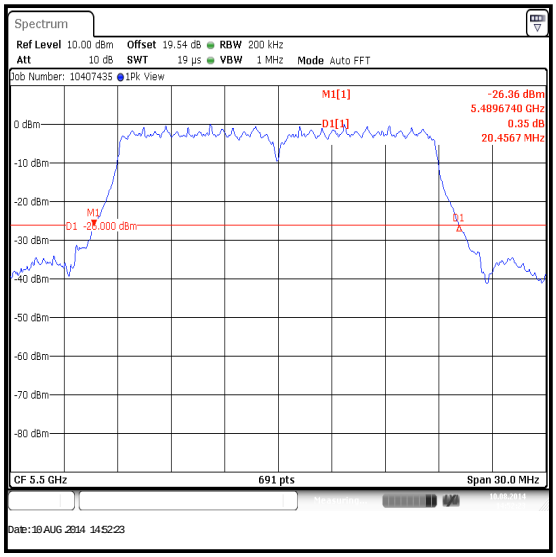


Top Channel

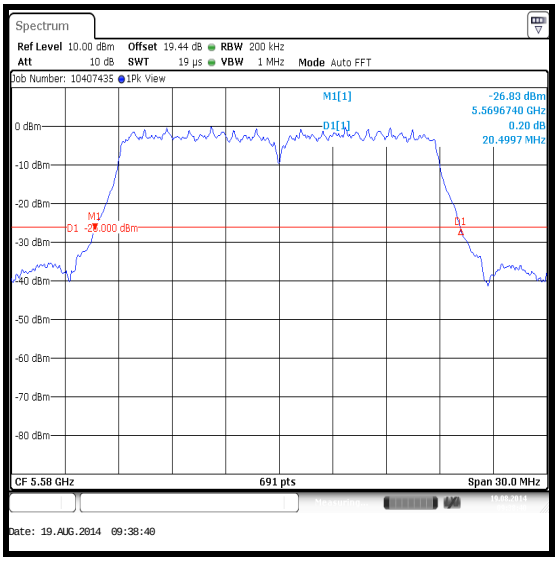
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.47-5.725 GHz band / Port 2

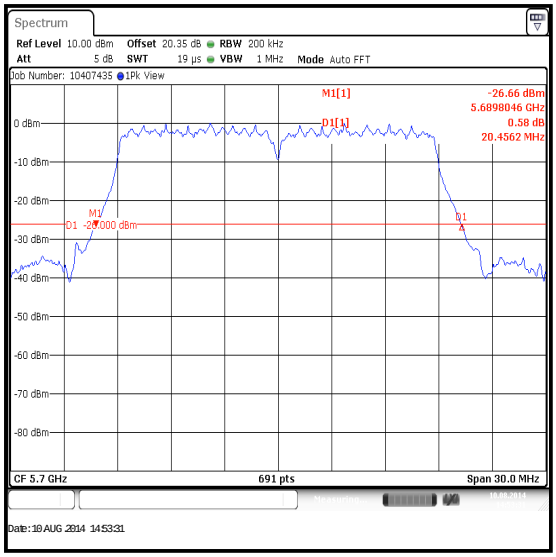
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5500	BPSK	6.5 / 0	20.457
Middle	5580	BPSK	6.5 / 0	20.500
Top	5700	BPSK	6.5 / 0	20.456



Bottom Channel



Middle Channel

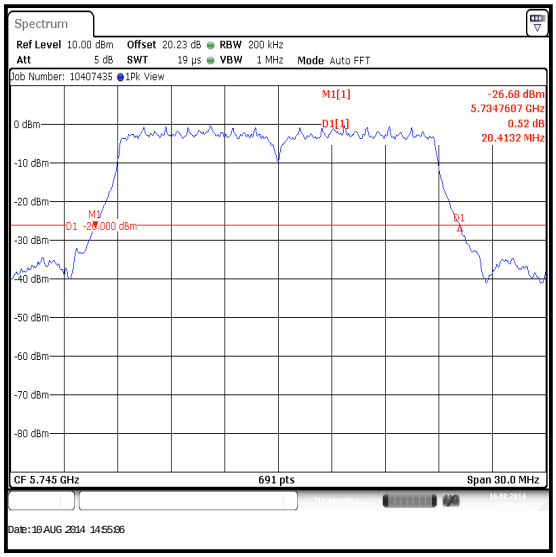


Top Channel

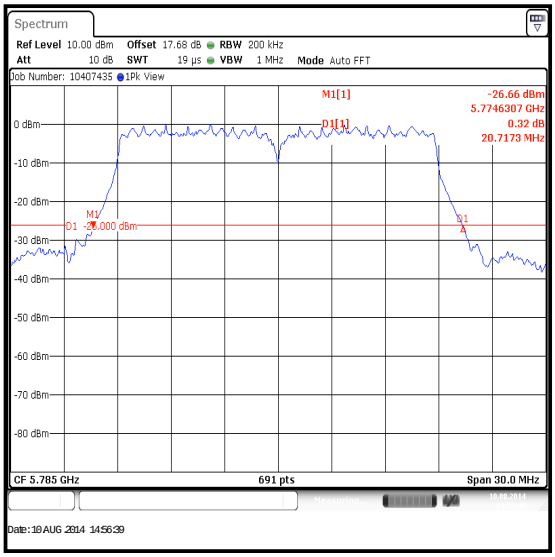
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 20 MHz / MIMO / 5.725-5.85 GHz band / Port 2

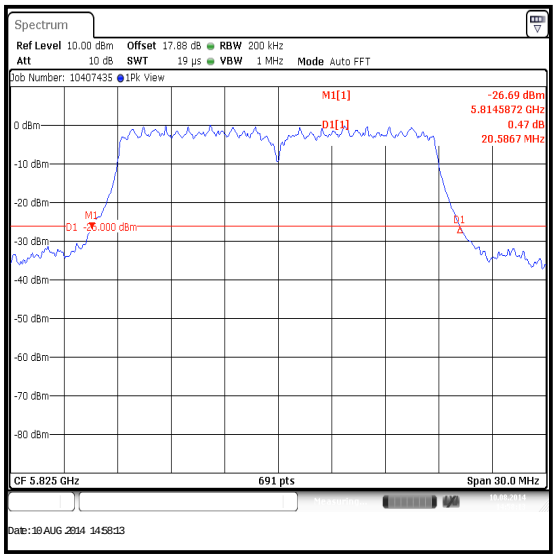
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5745	BPSK	6.5 / 0	20.413
Middle	5785	BPSK	6.5 / 0	20.717
Top	5825	BPSK	6.5 / 0	20.587



Bottom Channel



Middle Channel

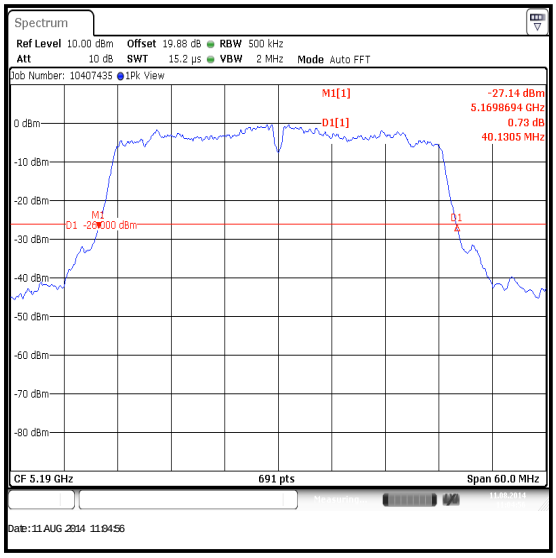


Top Channel

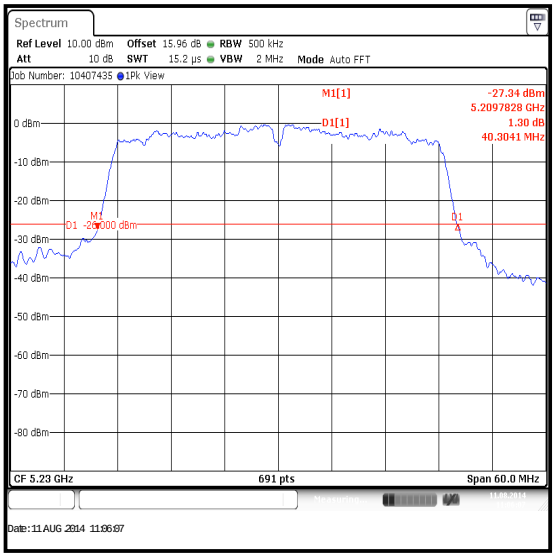
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.15-5.25 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	BPSK	13.5 / 0	40.131
Top	5230	BPSK	13.5 / 0	40.304



Bottom Channel

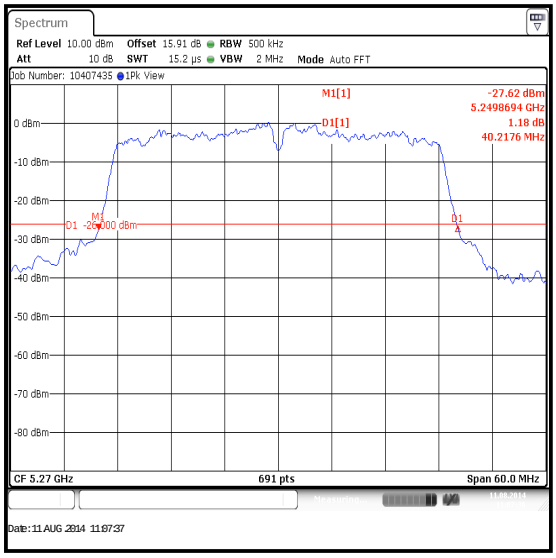


Top Channel

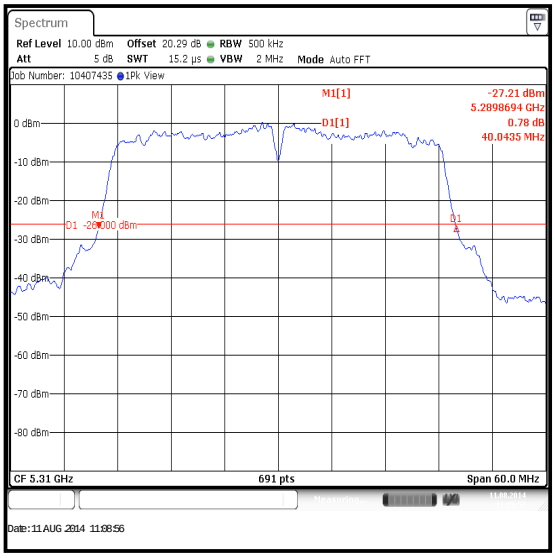
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.25-5.35 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	BPSK	13.5 / 0	40.218
Top	5310	BPSK	13.5 / 0	40.044



Bottom Channel

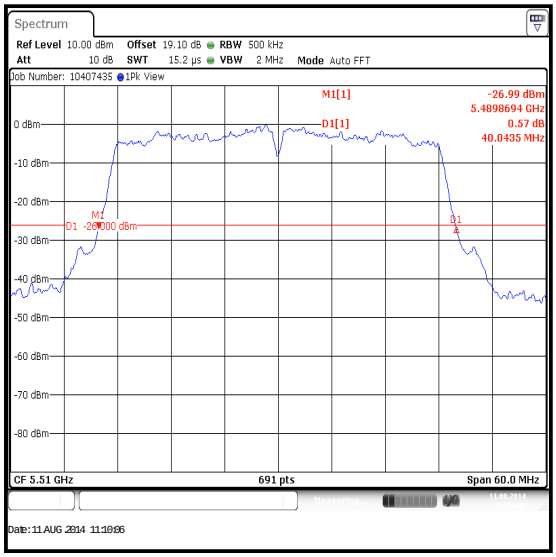


Top Channel

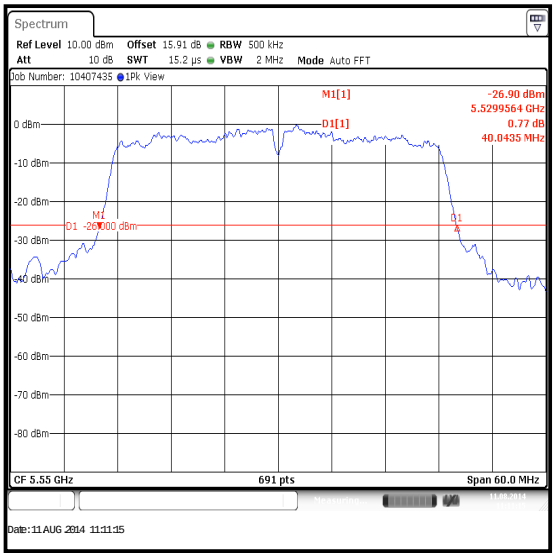
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.47-5.725 GHz band / Port 1

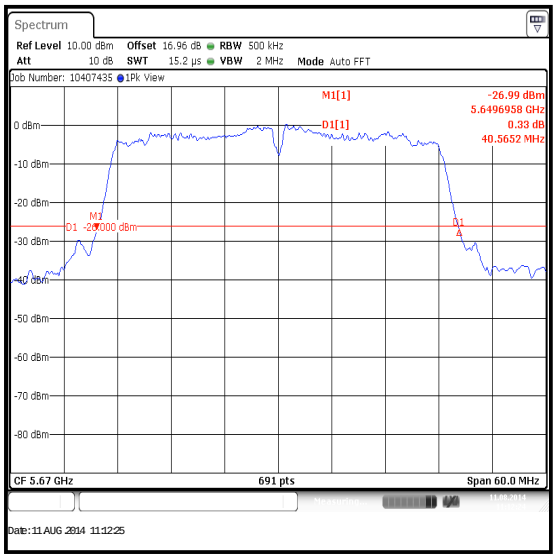
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	BPSK	13.5 / 0	40.044
Middle	5550	BPSK	13.5 / 0	40.044
Top	5670	BPSK	13.5 / 0	40.565



Bottom Channel



Middle Channel

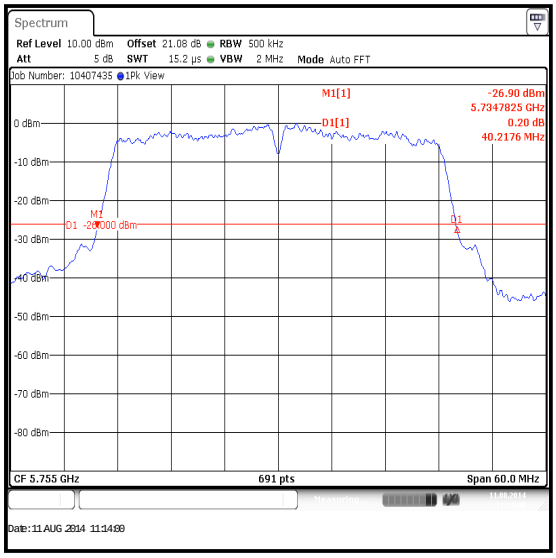


Top Channel

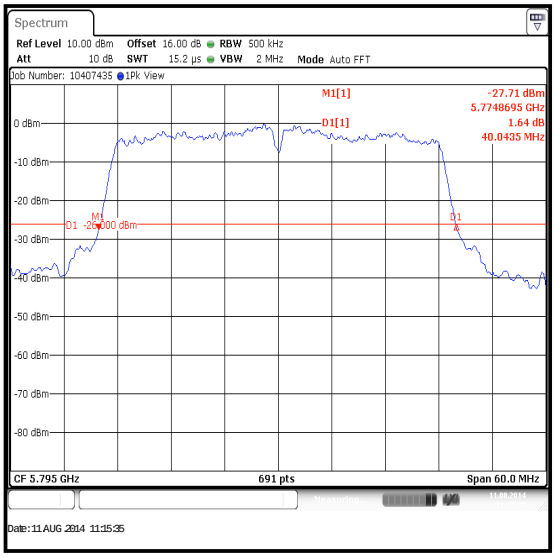
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.725-5.85 GHz band / Port 1

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5755	BPSK	13.5 / 0	40.218
Top	5795	BPSK	13.5 / 0	40.044



Bottom Channel

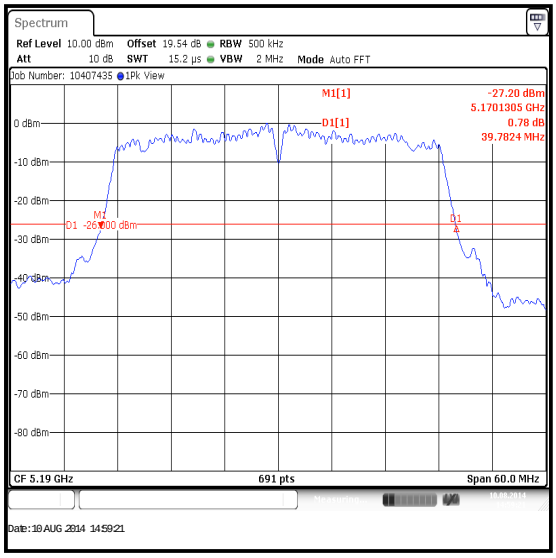


Top Channel

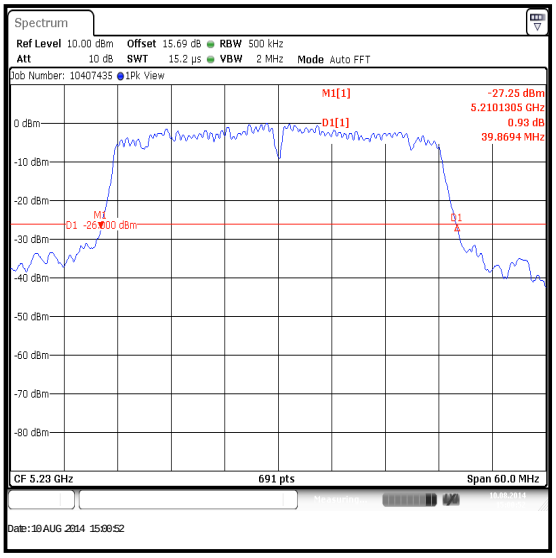
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.15-5.25 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5190	BPSK	13.5 / 0	39.782
Top	5230	BPSK	13.5 / 0	39.869



Bottom Channel

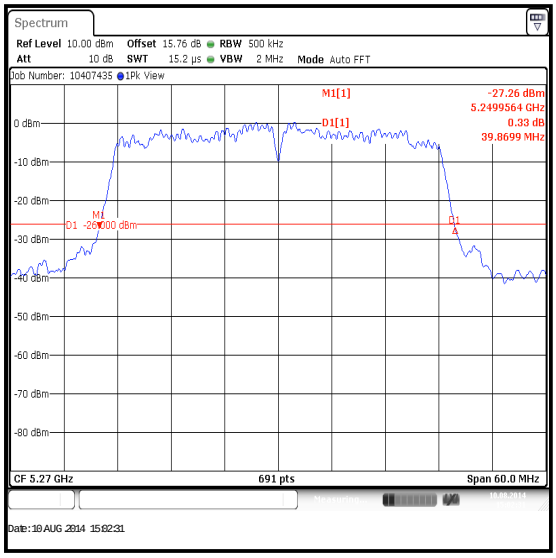


Top Channel

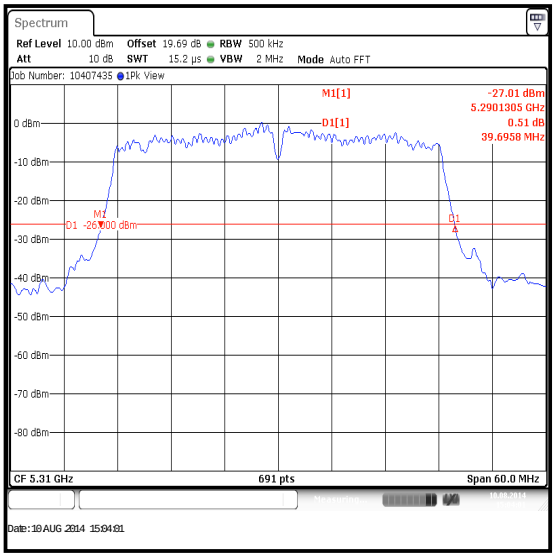
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.25-5.35 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5270	BPSK	13.5 / 0	39.870
Top	5310	BPSK	13.5 / 0	39.696



Bottom Channel

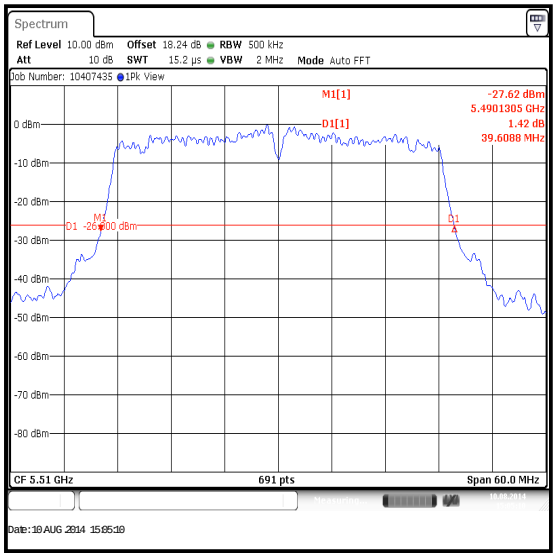


Top Channel

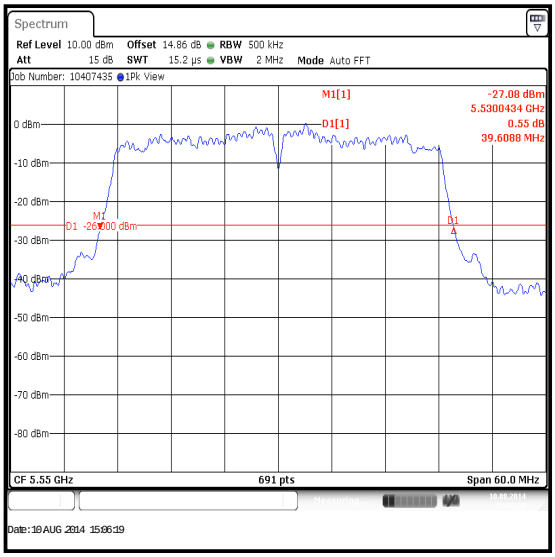
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.47-5.725 GHz band / Port 2

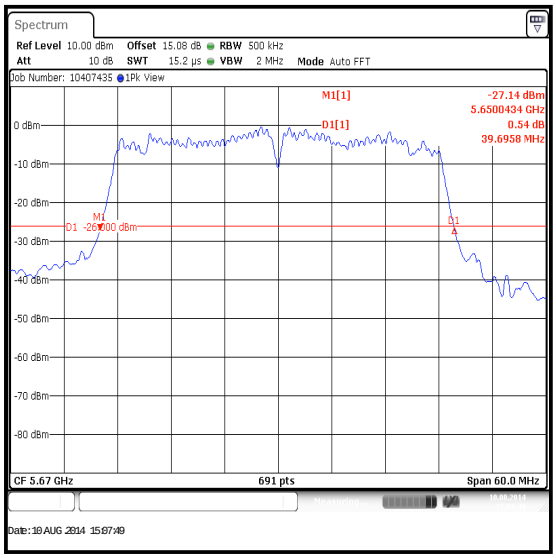
Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5510	BPSK	13.5 / 0	39.609
Middle	5550	BPSK	13.5 / 0	39.609
Top	5670	BPSK	13.5 / 0	39.696



Bottom Channel



Middle Channel

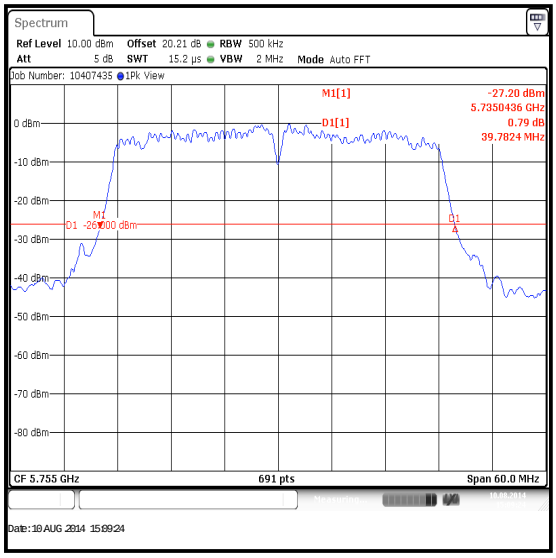


Top Channel

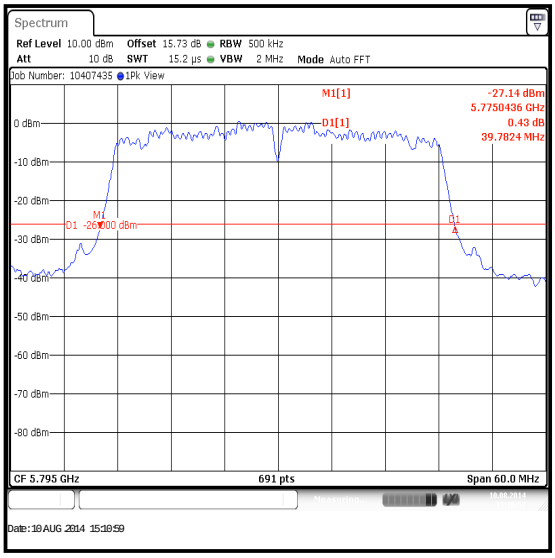
Transmitter 26 dB Emission Bandwidth (continued)

Results: 802.11n / 40 MHz / MIMO / 5.725-5.85 GHz band / Port 2

Channel	Frequency (MHz)	Modulation scheme	Data Rate Mbps / MCS	26 dB Emission Bandwidth (MHz)
Bottom	5755	BPSK	13.5 / 0	39.782
Top	5795	BPSK	13.5 / 0	39.782



Bottom Channel



Top Channel

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	15 May 2015	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
S0558	DC Power Supply	TTI	EL 303R	395825	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12

5.2.3. Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band)

Test Summary:

Test Engineers:	Nick Steele & Gerogios Vzeras	**Test Dates:**	10 August 2014 & 11 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.407(e)
Test Method Used:	As detailed in KDB 789033 D02 Section II.C.2.

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 45

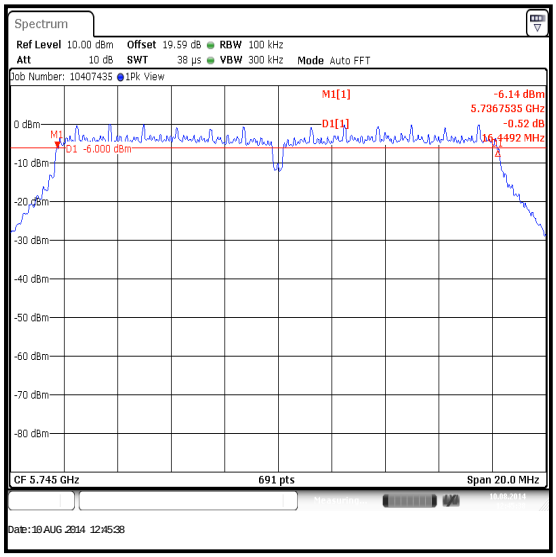
Note(s):

1. The customer declared the following data rates to be used for all measurements as:
    - 802.11a – BPSK / 6 Mbps
    - 802.11n HT20 SISO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
    - 802.11n HT20 MIMO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 MIMO – BPSK / 13.5 Mbps / MCS0
2. Final measurements were performed using the above configurations on the bottom, middle and top channels in accordance with KDB 789033 Section II.C.2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz measurement procedure.
3. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable.

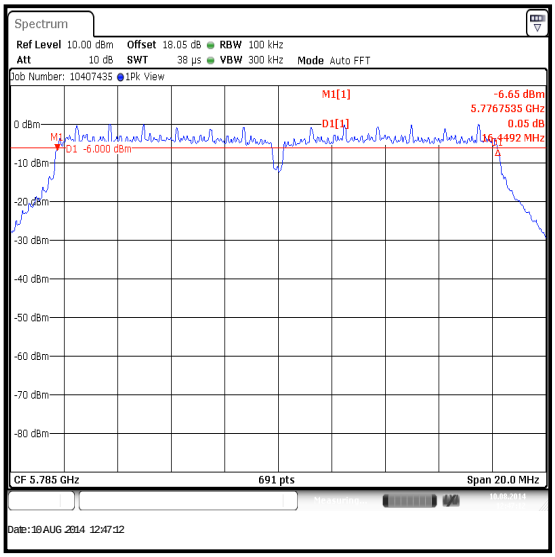
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Port 1

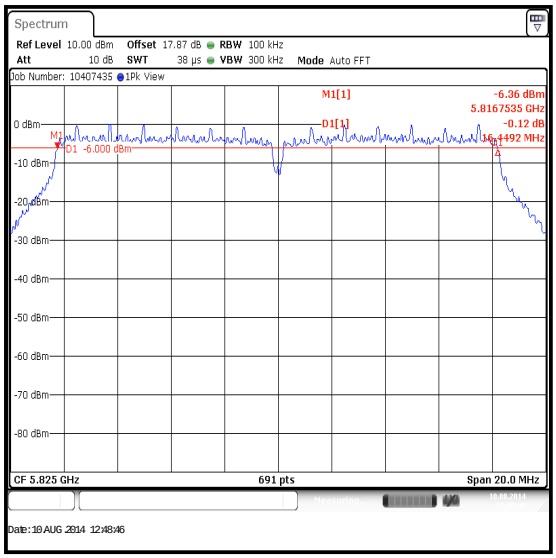
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	16449	≥500	15949	Complied
Middle	16449	≥500	15949	Complied
Top	16449	≥500	15949	Complied



Bottom Channel



Middle Channel

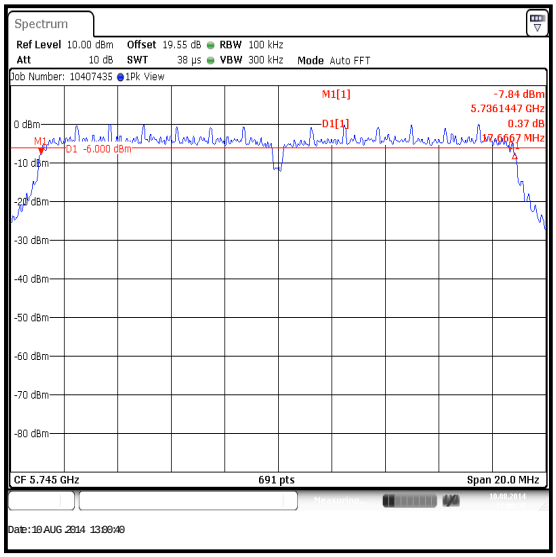


Top Channel

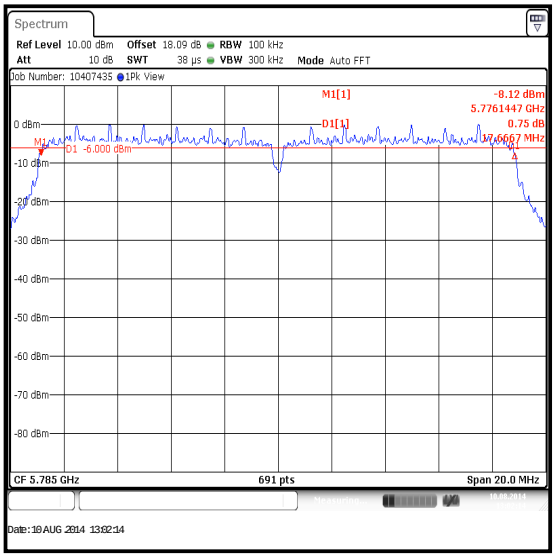
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / SISO / BPSK / MCS0 / Port 1

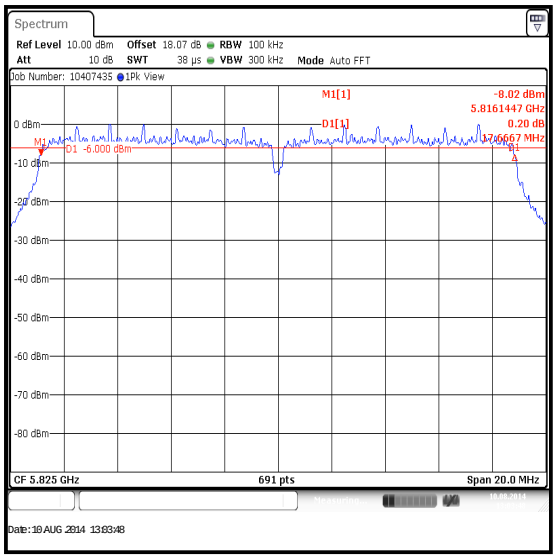
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	17667	≥500	17167	Complied
Middle	17667	≥500	17167	Complied
Top	17667	≥500	17167	Complied



Bottom Channel



Middle Channel

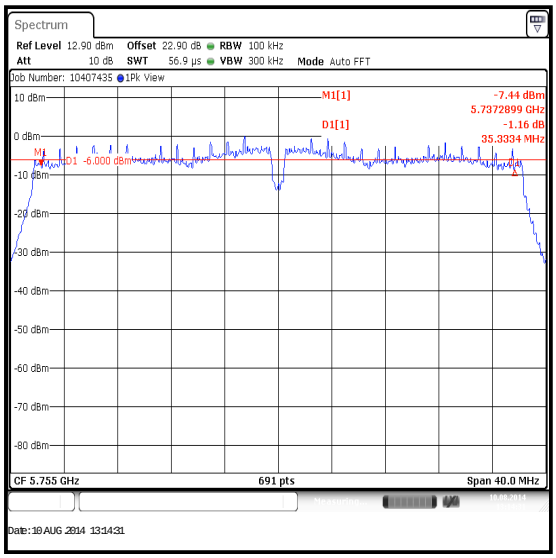


Top Channel

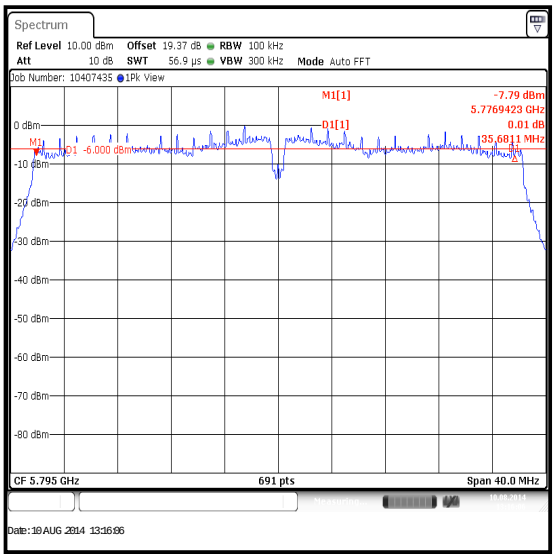
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / SISO / BPSK / MCS0 / Port 1

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	35333	≥500	34833	Complied
Top	35681	≥500	35181	Complied



Bottom Channel

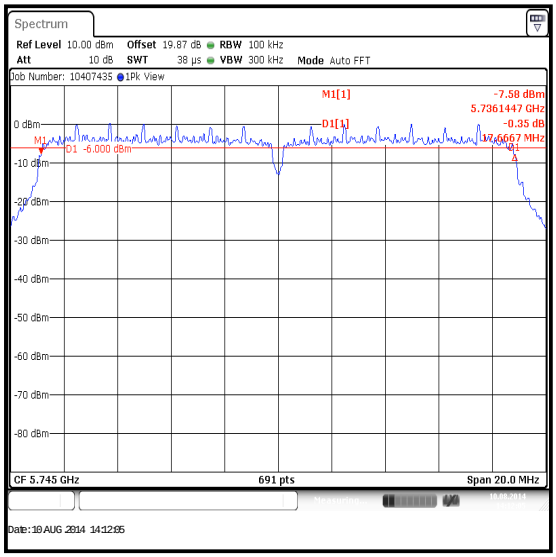


Top Channel

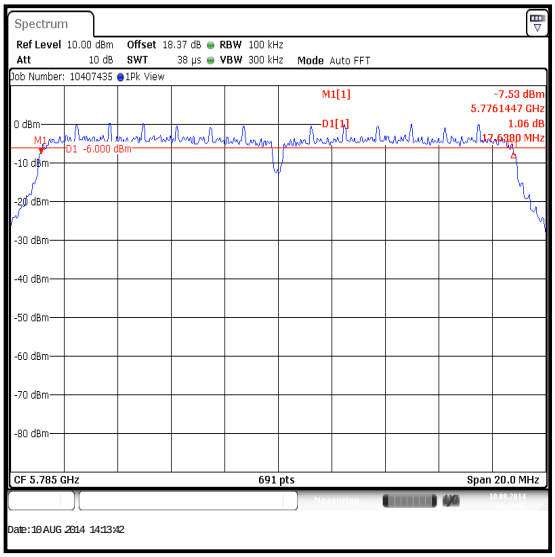
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / SISO / BPSK / MCS0 / Port 2

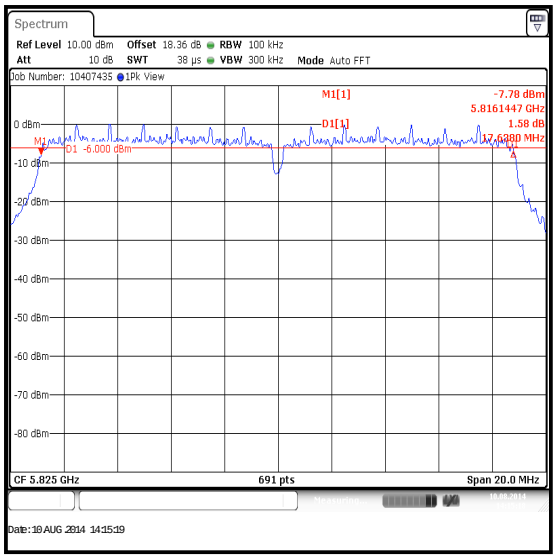
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	17667	≥500	17167	Complied
Middle	17638	≥500	17138	Complied
Top	17638	≥500	17138	Complied



Bottom Channel



Middle Channel

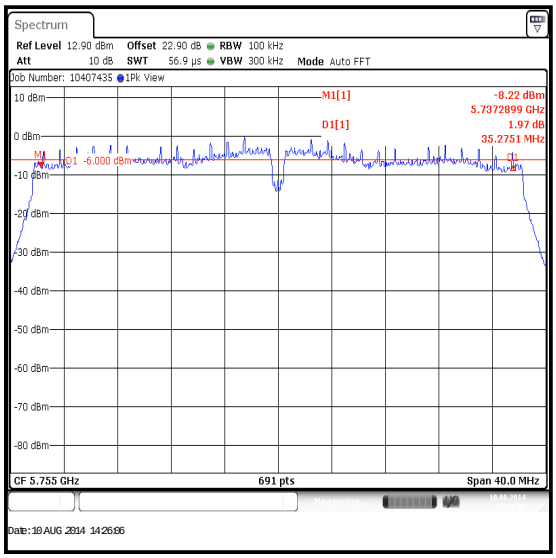


Top Channel

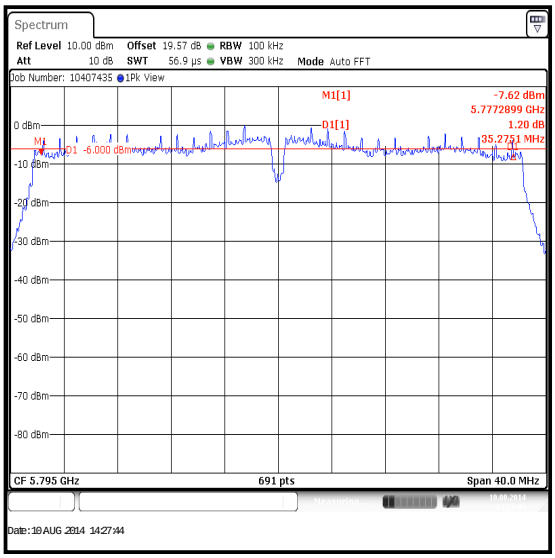
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / SISO / BPSK / MCS0 / Port 2

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	35275	≥500	34775	Complied
Top	35275	≥500	34775	Complied



Bottom Channel

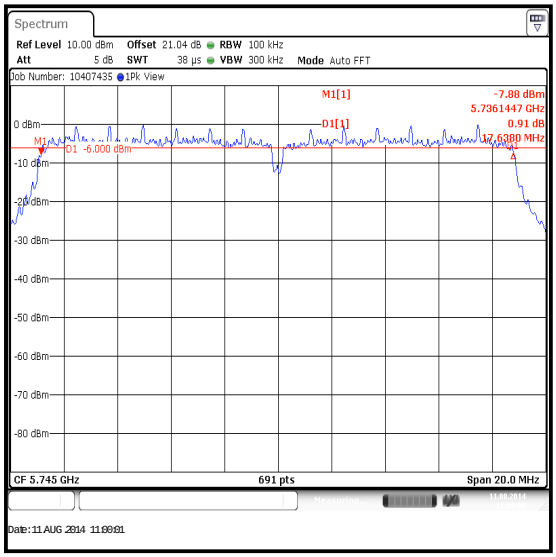


Top Channel

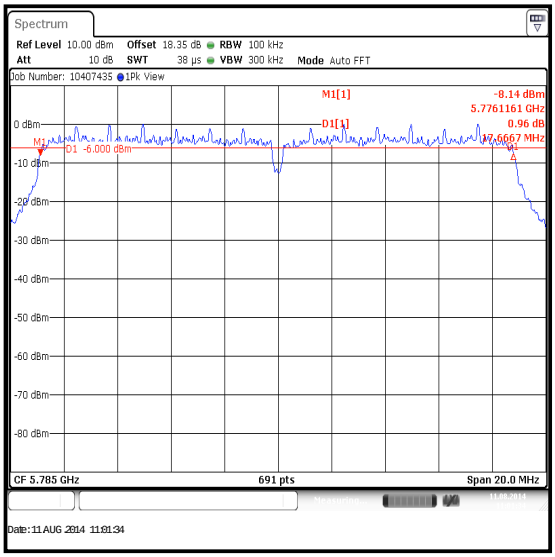
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Port 1

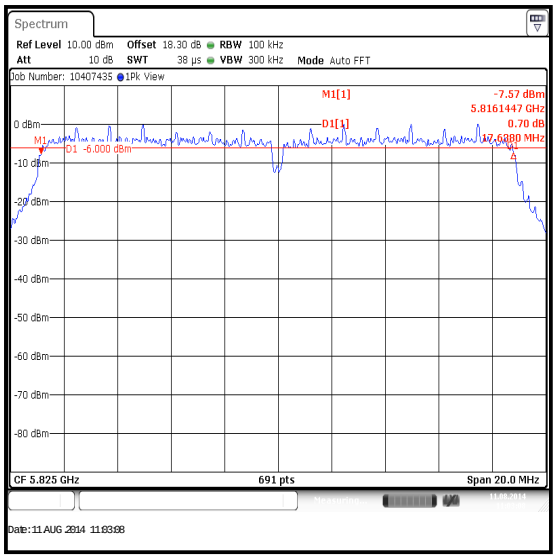
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	17638	≥500	17138	Complied
Middle	17667	≥500	17167	Complied
Top	17638	≥500	17138	Complied



Bottom Channel



Middle Channel

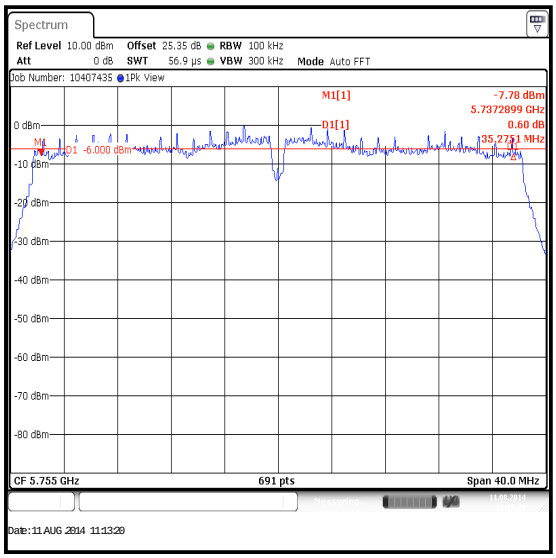


Top Channel

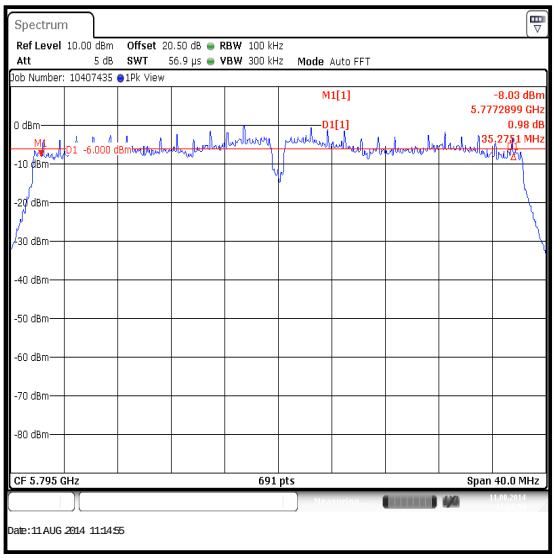
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0 / Port 1

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	35275	≥500	34775	Complied
Top	35275	≥500	34775	Complied



Bottom Channel

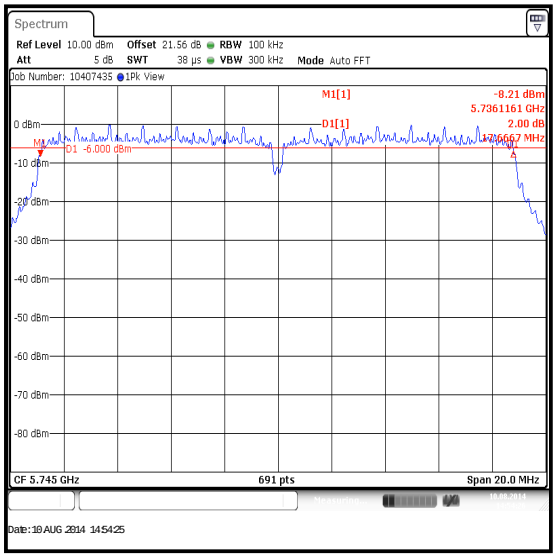


Top Channel

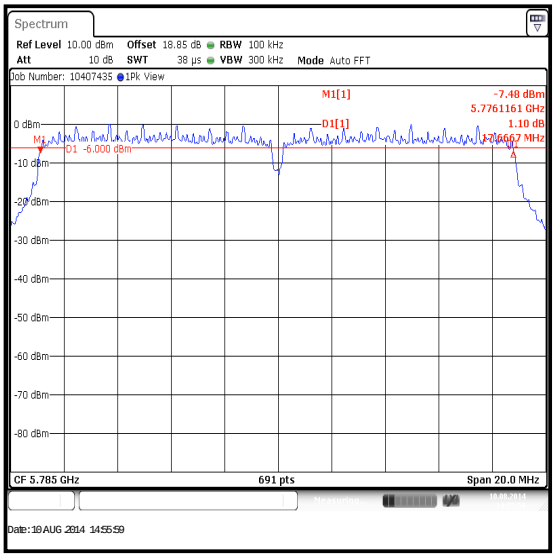
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Port 2

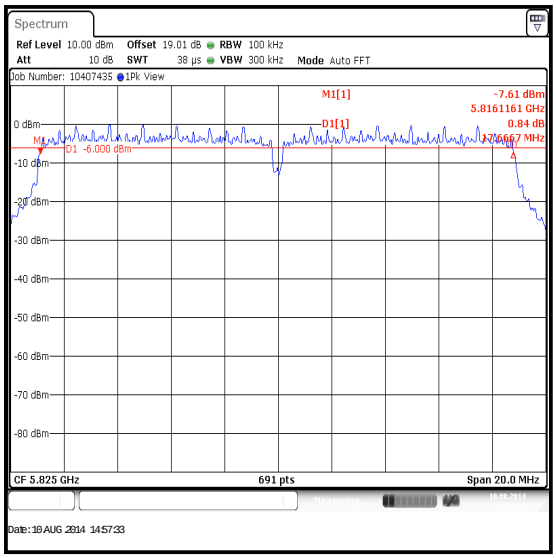
Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	17667	≥500	17167	Complied
Middle	17667	≥500	17167	Complied
Top	17667	≥500	17167	Complied



Bottom Channel



Middle Channel

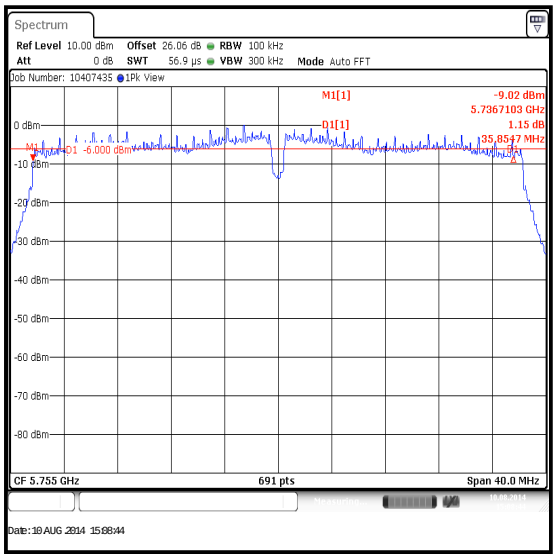


Top Channel

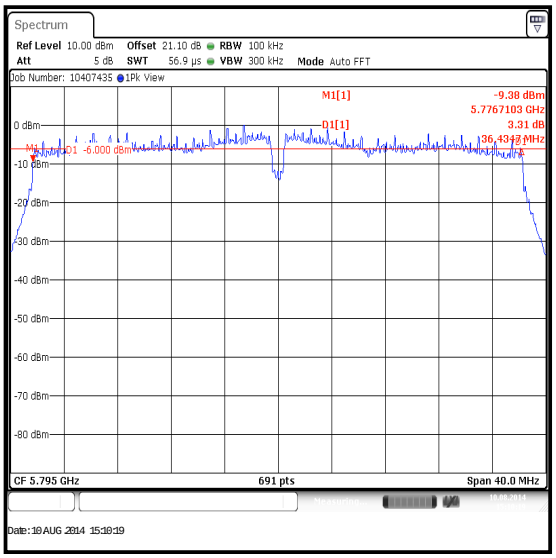
Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / MIMO / BPSK / MCS0 / Port 2

Channel	6 dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)	Result
Bottom	35855	≥500	35355	Complied
Top	36435	≥500	35935	Complied



Bottom Channel



Top Channel

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	15 May 2015	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
S0558	DC Power Supply	TTI	EL 303R	395825	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12

5.2.4. Transmitter Duty Cycle

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	11 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.35(c)
Test Method Used:	As detailed in KDB 789033 D02 Section II.B.2.b)

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	38

Note(s):

1. In order to assist with the determination of the average level of fundamental and spurious emissions field strength, measurements were made of duty cycle to determine the transmission duration and the silent period time of the transmitter. The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated by using the following calculation:

   10 log 1 / (On Time / [Period or 100ms whichever is the lesser]).

   802.11n / 6.5 Mbps duty cycle: 10 log (1 / (1.887/1.937)) = 0.1
   802.11n / 13.5 Mbps duty cycle: 10 log (1 / (0.919/0.958)) = 0.2

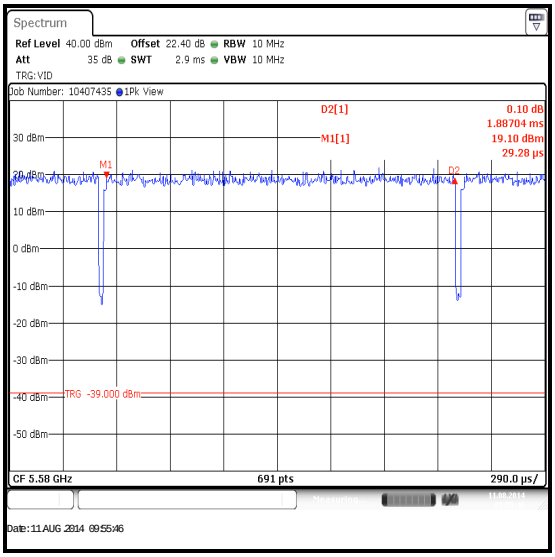
2. For all other data rates the duty cycle was measured to be greater than 98%.

Transmitter Duty Cycle (continued)

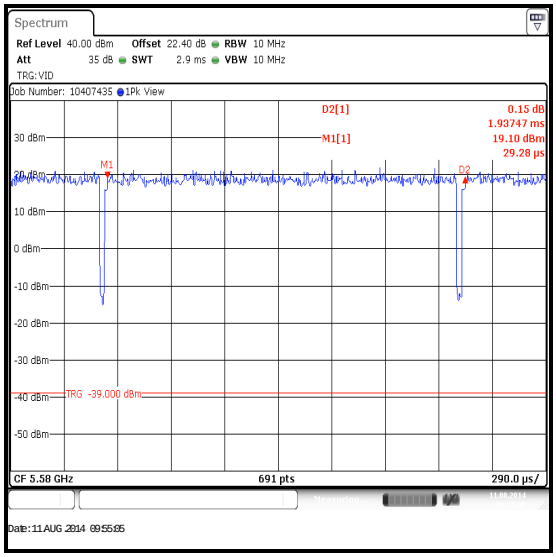
Results: 802.11n / 20 MHz / 6.5 Mbps / MCS0

Pulse Duration (ms)	Duty Cycle (dB)
1.887	0.1

Period (ms)
1.937



TX on time



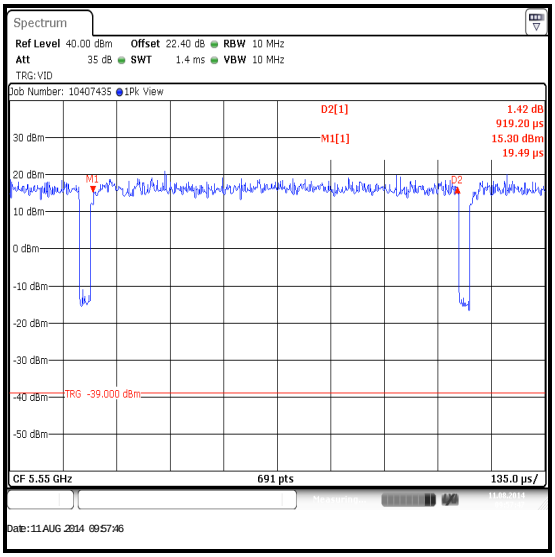
TX on + off time

Transmitter Duty Cycle (continued)

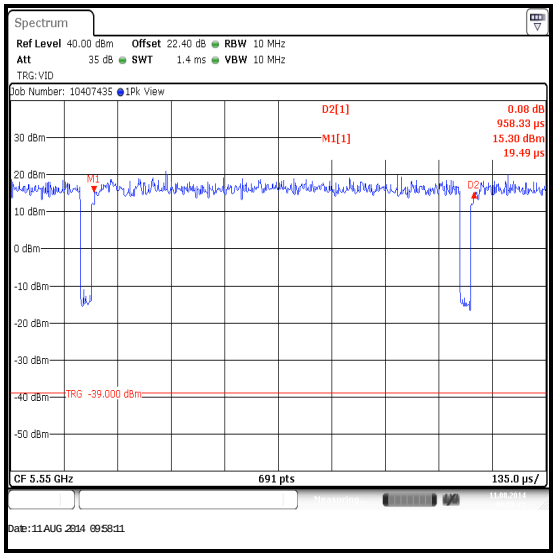
Results: 802.11n / 40 MHz / 13.5 Mbps / MCS0

Pulse Duration (ms)	Duty Cycle (dB)
0.919	0.2

Period (ms)
0.958



TX on time



TX on + off time

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	15 May 2015	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
S0558	DC Power Supply	TTI	EL 303R	395825	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12

5.2.5. Transmitter Maximum Conducted Output Power

Test Summary:

Test Engineers:	Nick Steele & Georgios Vrezas	**Test Dates:**	10 August 2014 & 11 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.407(a)(1)(iv)
Test Method Used:	As detailed in KDB 789033 D02 Section II.E.2.b) and II.E.2.d)

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 45

Note(s):

1. For conducted power tests where the duty cycle is >98%, the measurements were performed using a signal analyser in accordance with FCC KDB 789033 II.E.2.b) Method SA-1. Where the duty cycle is <98%, the measurements were performed in accordance with FCC KDB 789033 II.E.2.d) Method SA-2.
2. Measurements were performed on the bottom, middle and top channels. The customer declared the following data rates to be used for all measurements as:
    - 802.11a – BPSK / 6 Mbps
    - 802.11n HT20 SISO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 SISO – BPSK / 13.5 Mbps / MCS0
    - 802.11n HT20 MIMO – BPSK / 6.5 Mbps / MCS0
    - 802.11n HT40 MIMO – BPSK / 13.5 Mbps / MCS0
3. For 802.11a, power was measured on both ports, Port 1 produced the highest power and was therefore deemed worst case. Results for Port 1 are recorded in the tables below.
4. For 802.11n the EUT can transmit from both antennas, therefore conducted measurements were performed on both ports. For SISO, Port 1 produced the highest power and was therefore deemed worst case. Results for Port 1 are recorded in the tables below. For MIMO both ports are recorded in the tables below.
5. For 802.11n MIMO mode, conducted power was measured on both ports and then combined using the measure-and-sum method stated in FCC KDB 662911.
6. For 802.11a and 802.11n SISO modes, the EUT antenna gain is <6 dBi.
7. For 802.11n MIMO mode, the data stream is correlated as it is single stream with CDD on. The directional antenna gain has been calculated in accordance with KDB 662911 D01 Section F)2)f)(ii). The EUT antenna has a gain of 0.0 dBi for Port 1 and 3.1 dBi for Port 2, in the frequency range 5.15 GHz to 5.25 GHz.

$$\text{Directional Gain} = 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left(\sum_{k=1}^{N_{ANT}} g_{j,k}\right)^2}{N_{ANT}}\right]$$

the equation above gives the following result:

$$\text{Directional Gain} = 10\log\left[\frac{\left(10^{\frac{0.0}{20}} + 10^{\frac{3.1}{20}}\right)^2}{2}\right] = 4.7\ dBi$$

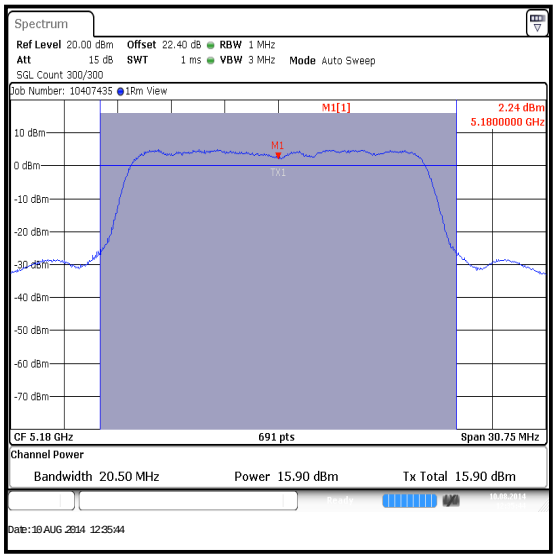
As the calculated directional gain is less than 6 dBi, the limit remains unchanged.

8. For data rates where the EUT was transmitting at <98% duty cycle, the calculated duty cycle in section 5.2.4 was added to the measured power in order to compute the average power during the actual transmission time.
9. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
10. The Part 15.407(a)(1)(iv) limit shall not exceed 250 mW (24.0 dBm).

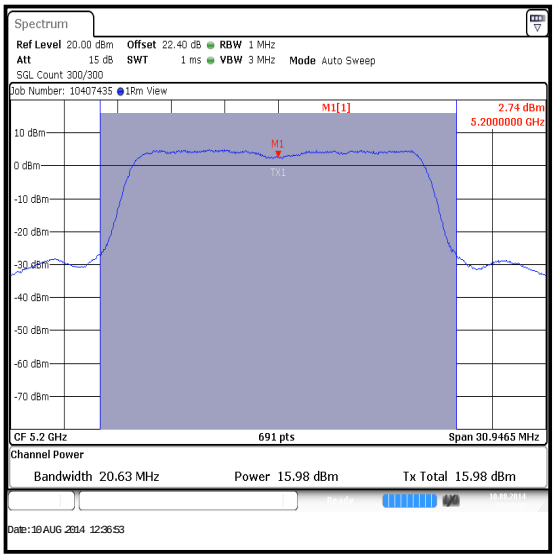
Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Port 1

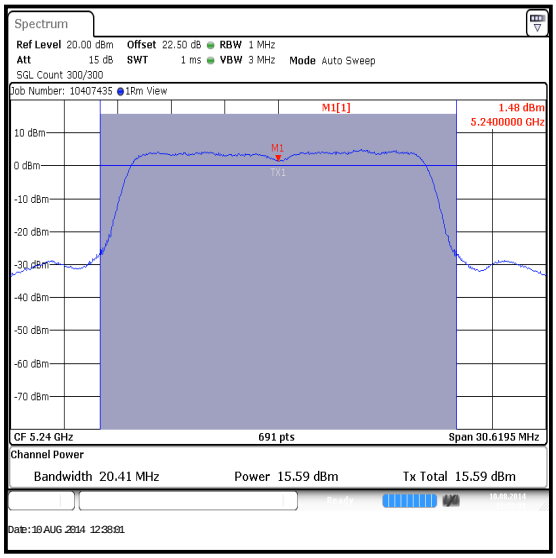
Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	15.9	24.0	8.1	Complied
Middle	5200	16.0	24.0	8.0	Complied
Top	5240	15.6	24.0	8.4	Complied



Bottom Channel



Middle Channel

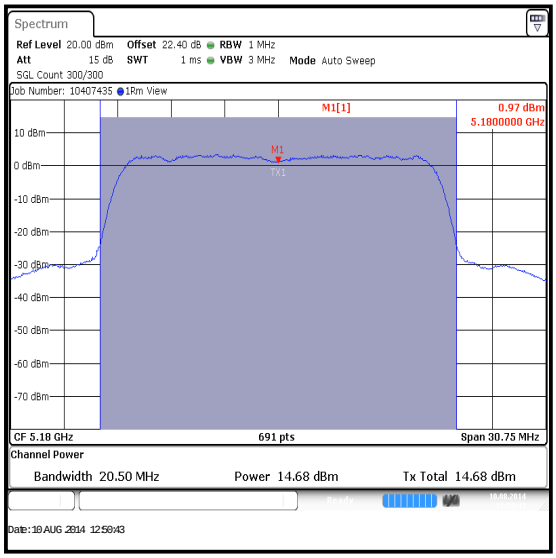


Top Channel

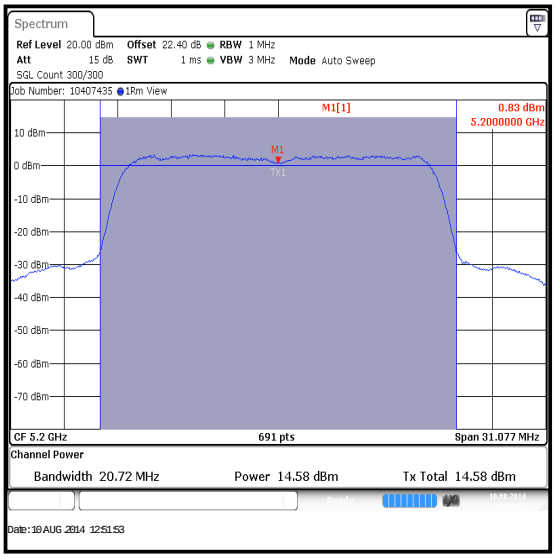
Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11n / 20 MHz / BPSK / MCS0 / SISO / Port 1

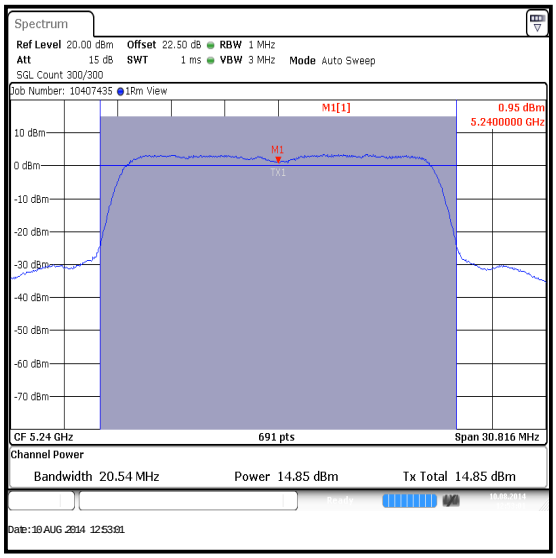
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	14.7	0.1	14.8	24.0	9.2	Complied
Middle	5200	14.6	0.1	14.7	24.0	9.3	Complied
Top	5240	14.9	0.1	15.0	24.0	9.0	Complied



Bottom Channel



Middle Channel

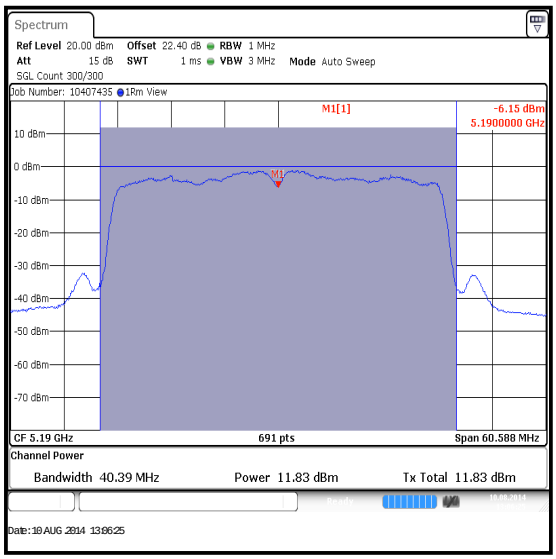


Top Channel

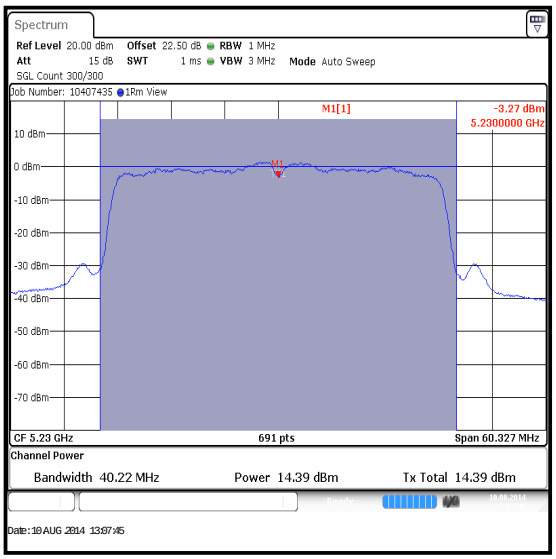
Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / SISO / Port 1

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5270	11.8	0.2	12.0	24.0	12.0	Complied
Top	5310	14.4	0.2	14.6	24.0	9.4	Complied



Bottom Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

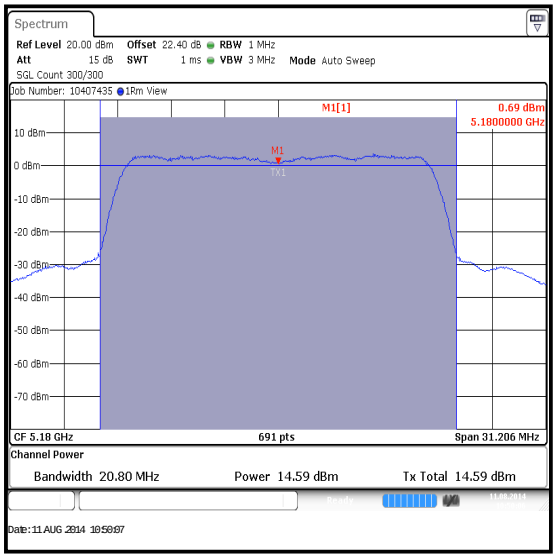
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	14.6	0.1	14.7	13.5	0.1	13.6
Middle	14.4	0.1	14.5	13.3	0.1	13.4
Top	14.3	0.1	14.4	13.4	0.1	13.5

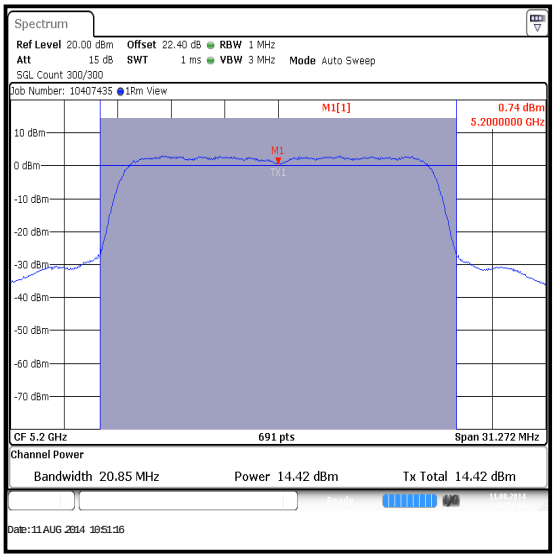
Channel	Frequency (MHz)	Conducted Power Port 1 (dBm)	Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	14.7	13.6	17.2	24.0	6.8	Complied
Middle	5200	14.5	13.4	17.0	24.0	7.0	Complied
Top	5240	14.4	13.5	17.0	24.0	7.0	Complied

Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

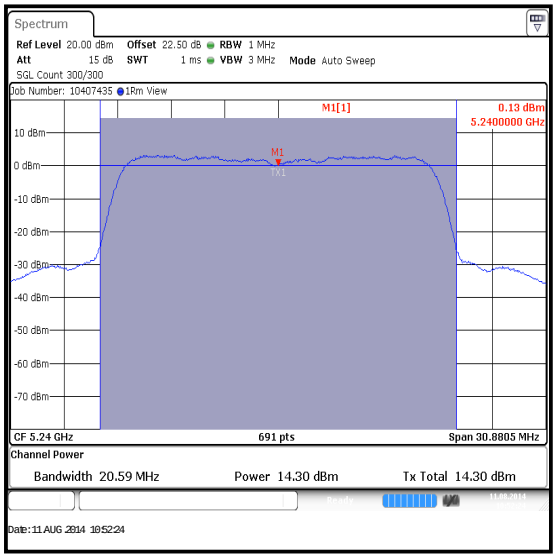
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / Port 1



Bottom Channel



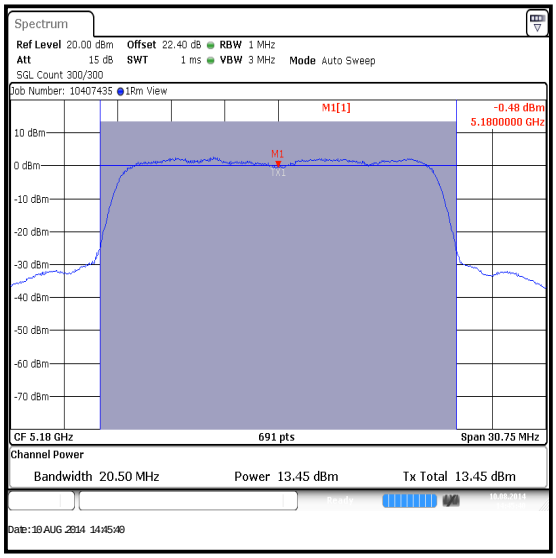
Middle Channel



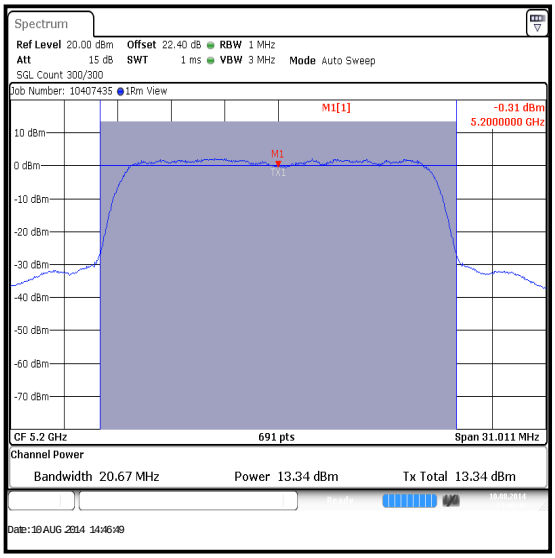
Top Channel

Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

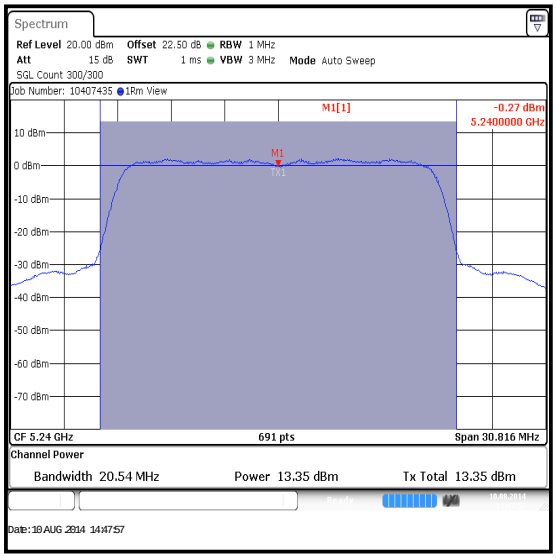
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / Port 2



Bottom Channel



Middle Channel



Top Channel

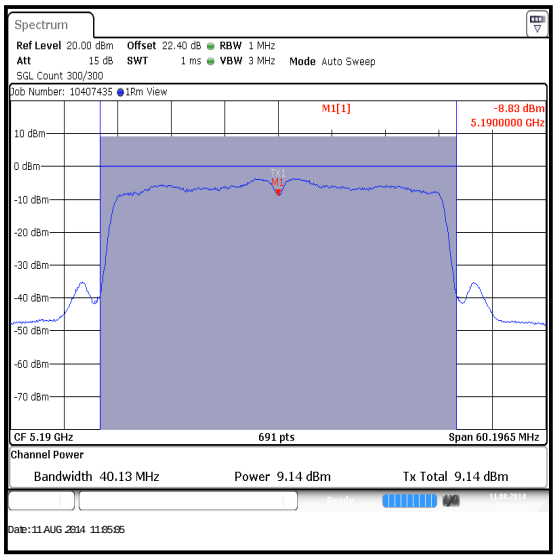
Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO

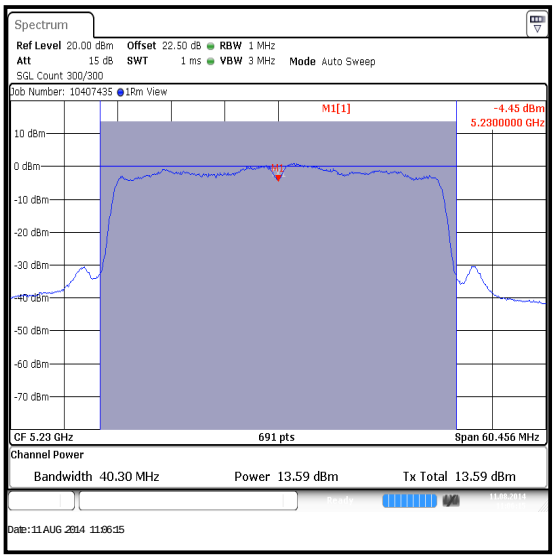
Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	9.1	0.2	9.3	7.9	0.2	8.1
Top	13.6	0.2	13.8	12.4	0.2	12.6

Channel	Frequency (MHz)	Corrected Conducted Power Port 1 (dBm)	Corrected Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5190	9.3	8.1	11.7	24.0	12.3	Complied
Top	5230	13.8	12.6	16.2	24.0	7.8	Complied

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / Port 1



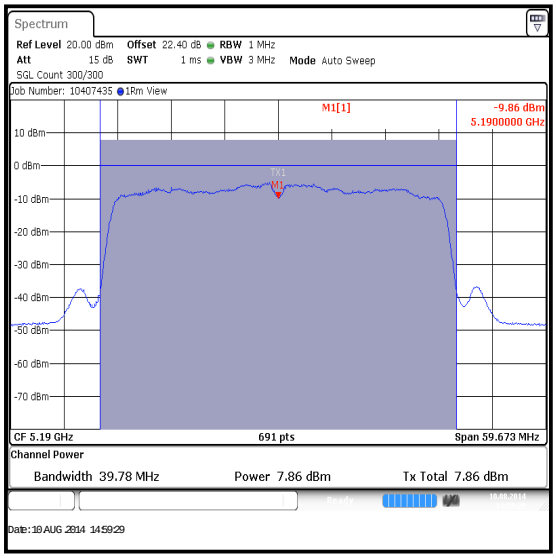
Bottom Channel



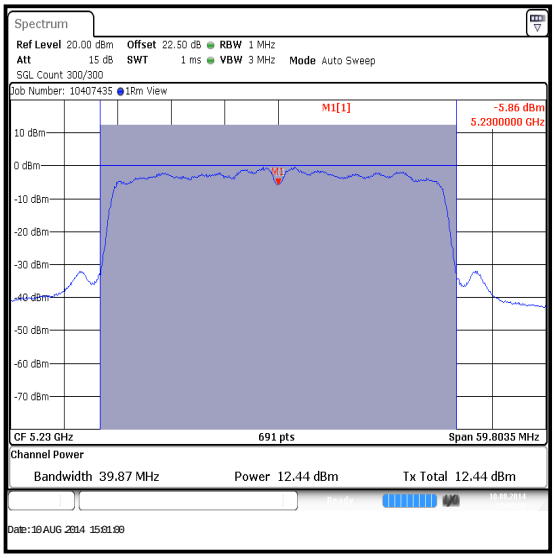
Top Channel

Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / Port 2



Bottom Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands)

Test Summary:

Test Engineers:	Nick Steele & Georgios Vrezas	**Test Dates:**	10 August 2014 to 19 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.407(a)(2)
Test Method Used:	As detailed in KDB 789033 D02 Section II.E.2.b) and II.E.2.d)

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	39 to 44

Note(s):

1. The FCC Part 15.407(a)(2) limit is the lesser of 250 mW (24.0 dBm) or 11 dBm + 10 $\log_{10}$ B, where B is the previously measured 26 dB emission bandwidth in MHz. The limit for each channel was calculated as below:

5.25-5.35 GHz band

802.11a 20 MHz channel width / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.326 = 24.1 dBm*
802.11a 20 MHz channel width / Middle channel = *11 dBm + 10 $\log_{10}$ 20.283 = 24.1 dBm*
802.11a 20 MHz channel width / Top channel = *11 dBm + 10 $\log_{10}$ 20.239 = 24.1 dBm*
802.11n 20 MHz channel width / SISO / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.587 = 24.1 dBm*
802.11n 20 MHz channel width / SISO / Middle channel = *11 dBm + 10 $\log_{10}$ 20.587 = 24.1 dBm*
802.11n 20 MHz channel width / SISO / Top channel = *11 dBm + 10 $\log_{10}$ 20.544 = 24.1 dBm*
802.11n 40 MHz channel width / SISO / Bottom channel = *11 dBm + 10 $\log_{10}$ 40.392 = 27.1 dBm*
802.11n 40 MHz channel width / SISO / Top channel = *11 dBm + 10 $\log_{10}$ 40.304 = 27.1 dBm*
802.11n 20 MHz channel width / MIMO / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.630 = 24.1 dBm*
802.11n 20 MHz channel width / MIMO / Middle channel = *11 dBm + 10 $\log_{10}$ 20.630 = 24.1 dBm*
802.11n 20 MHz channel width / MIMO / Top channel = *11 dBm + 10 $\log_{10}$ 20.370 = 24.1 dBm*
802.11n 40 MHz channel width / MIMO / Bottom channel = *11 dBm + 10 $\log_{10}$ 40.218 = 27.0 dBm*
802.11n 40 MHz channel width / MIMO / Top channel = *11 dBm + 10 $\log_{10}$ 40.044 = 27.0 dBm*

5.47-5.725 GHz band

802.11a 20 MHz channel width / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.283 = 24.1 dBm*
802.11a 20 MHz channel width / Middle channel = *11 dBm + 10 $\log_{10}$ 20.240 = 24.1 dBm*
802.11a 20 MHz channel width / Top channel = *11 dBm + 10 $\log_{10}$ 20.239 = 24.1 dBm*
802.11n 20 MHz channel width / SISO / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.543 = 24.1 dBm*
802.11n 20 MHz channel width / SISO / Middle channel = *11 dBm + 10 $\log_{10}$ 20.804 = 24.2 dBm*
802.11n 20 MHz channel width / SISO / Top channel = *11 dBm + 10 $\log_{10}$ 20.543 = 24.1 dBm*
802.11n 40 MHz channel width / SISO / Bottom channel = *11 dBm + 10 $\log_{10}$ 40.043 = 27.0 dBm*
802.11n 40 MHz channel width / SISO / Middle channel = *11 dBm + 10 $\log_{10}$ 40.131 = 27.0 dBm*
802.11n 40 MHz channel width / SISO / Top channel = *11 dBm + 10 $\log_{10}$ 40.218 = 27.0 dBm*
802.11n 20 MHz channel width / MIMO / Bottom channel = *11 dBm + 10 $\log_{10}$ 20.457 = 24.1 dBm*
802.11n 20 MHz channel width / MIMO / Middle channel = *11 dBm + 10 $\log_{10}$ 20.500 = 24.1 dBm*
802.11n 20 MHz channel width / MIMO / Top channel = *11 dBm + 10 $\log_{10}$ 20.456 = 24.1 dBm*
802.11n 40 MHz channel width / MIMO / Bottom channel = *11 dBm + 10 $\log_{10}$ 39.609 = 27.0 dBm*
802.11n 40 MHz channel width / MIMO / Middle channel = *11 dBm + 10 $\log_{10}$ 39.609 = 27.0 dBm*
802.11n 40 MHz channel width / MIMO / Top channel = *11 dBm + 10 $\log_{10}$ 39.696 = 27.0 dBm*

The lesser of the two limits is the fixed limit of 250 mW (24.0 dBm). This was applied to the results.

2. For 802.11n MIMO mode, the data stream is correlated as it is single stream with CDD on. The directional antenna gain has been calculated in accordance with KDB 662911 D01 Section F)2)f)(ii). The EUT antenna has a gain of 0.8 dBi for Port 1 and 3.3 dBi for Port 2, in the frequency range 5.25 GHz to 5.35 GHz.

$$\text{Directional Gain} - 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left(\sum_{k=1}^{N_{ANT}} g_{j,k}\right)^2}{N_{ANT}}\right]$$

the equation above gives the following result:

$$\text{Directional Gain} = 10\log\left[\frac{\left(10^{\frac{0.8}{20}} + 10^{\frac{3.3}{20}}\right)^2}{2}\right] = 5.1\ dBi$$

3. The EUT antenna has a gain of 2.4 dBi for Port 1 and 4.3 dBi for Port 2, in the frequency range 5.47 GHz to 5.725 GHz.

$$\text{Directional Gain} = 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left(\sum_{k=1}^{N_{ANT}} g_{j,k}\right)^2}{N_{ANT}}\right]$$

the equation above gives the following result:

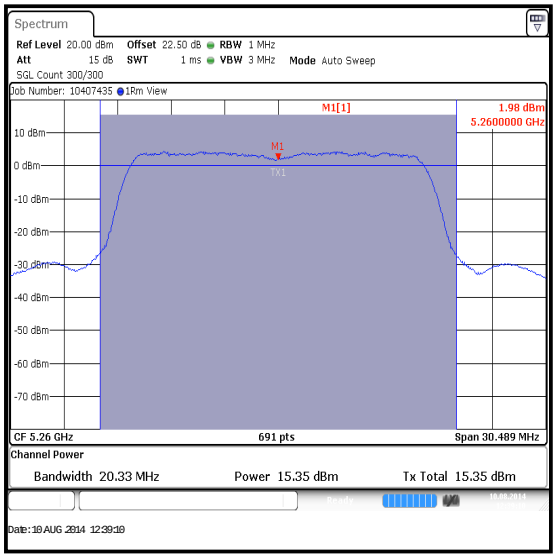
$$\text{Directional Gain} = 10\log\left[\frac{\left(10^{\frac{2.4}{20}} + 10^{\frac{4.3}{20}}\right)^2}{2}\right] = 6.4\ dBi$$

4. For 802.11n MIMO, in the 5.47 to 5.725 GHz band, the EUT antenna has a combined gain of 6.4 dBi. In accordance with 15.407(a)(2), the limit was reduced by the amount in dB the antenna gain exceeds 6 dBi. Therefore the limit of 24 dBm has been reduced by 0.4 dB to 23.6 dBm.

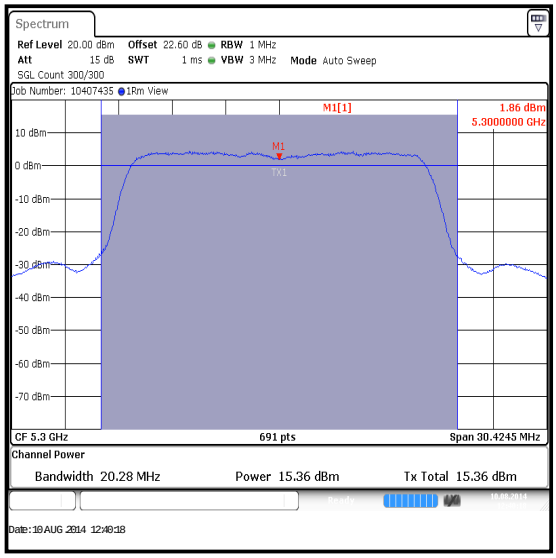
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11a / 20 MHz / BPSK / 6 Mbps / 5.25-5.35 GHz band / Port 1

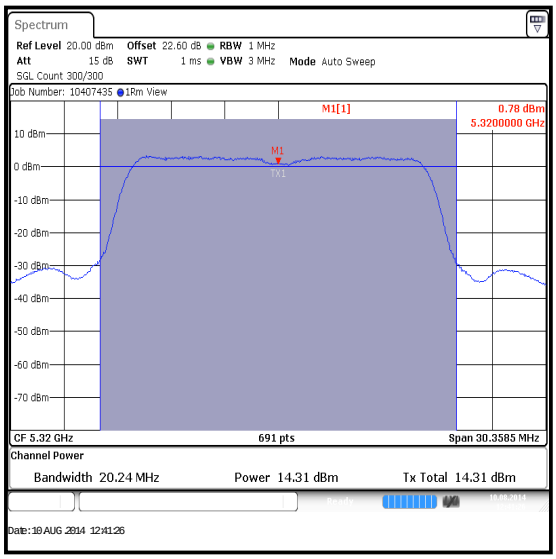
Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5260	15.4	24.0	8.6	Complied
Middle	5300	15.4	24.0	8.6	Complied
Top	5320	14.3	24.0	9.7	Complied



Bottom Channel



Middle Channel

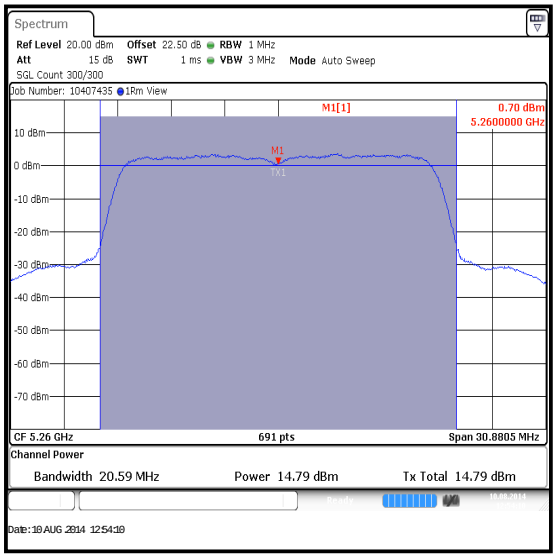


Top Channel

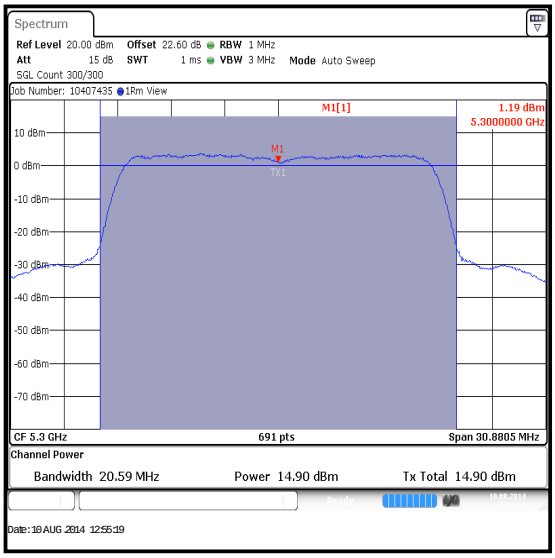
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 20 MHz / BPSK / MCS0 / SISO / 5.25-5.35 GHz band / Port 1

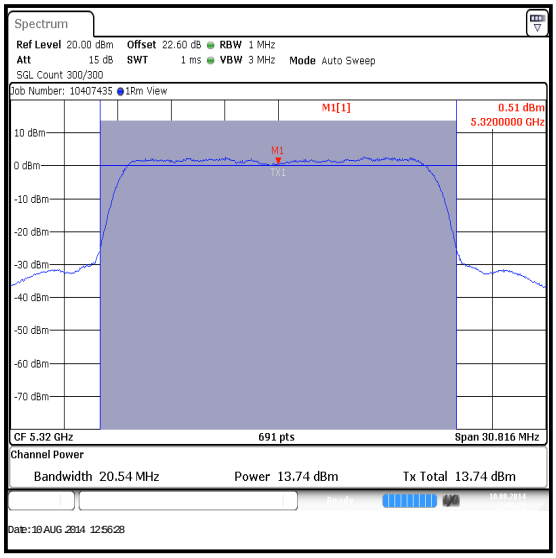
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5260	14.8	0.1	14.9	24.0	9.1	Complied
Middle	5300	14.9	0.1	15.0	24.0	9.0	Complied
Top	5320	13.7	0.1	13.8	24.0	10.2	Complied



Bottom Channel



Middle Channel

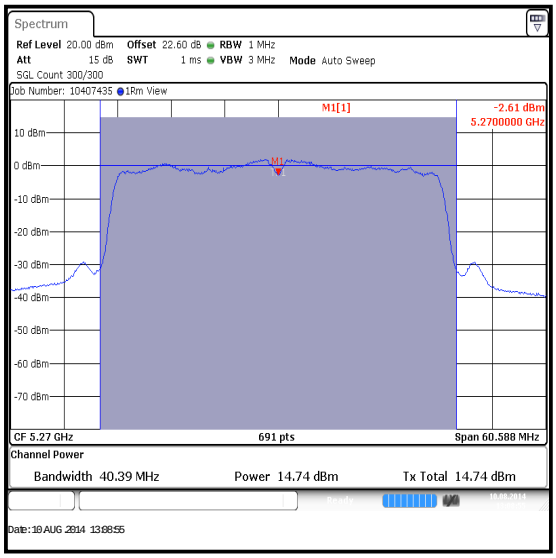


Top Channel

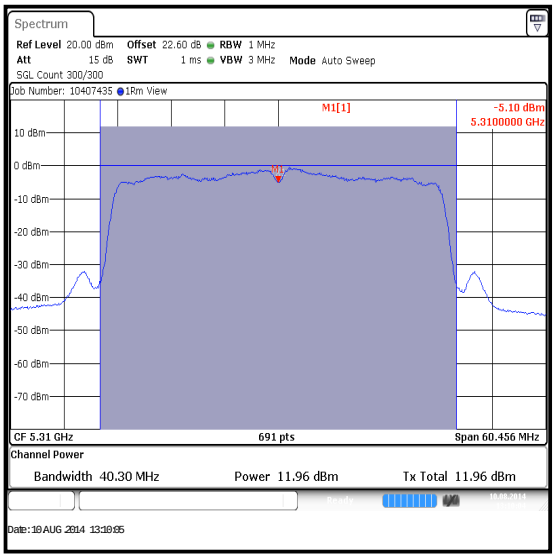
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / SISO / 5.25-5.35 GHz band / Port 1

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5270	14.7	0.2	14.9	24.0	9.1	Complied
Top	5310	12.0	0.2	12.2	24.0	11.8	Complied



Bottom Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

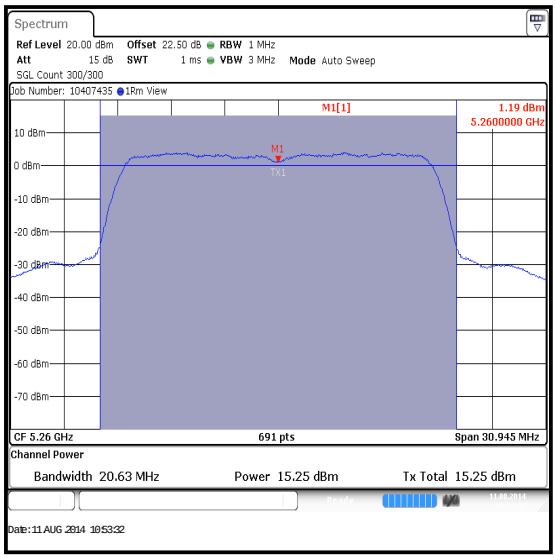
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	15.3	0.1	15.4	14.0	0.1	14.1
Middle	15.0	0.1	15.1	14.1	0.1	14.2
Top	12.4	0.1	12.5	11.5	0.1	11.6

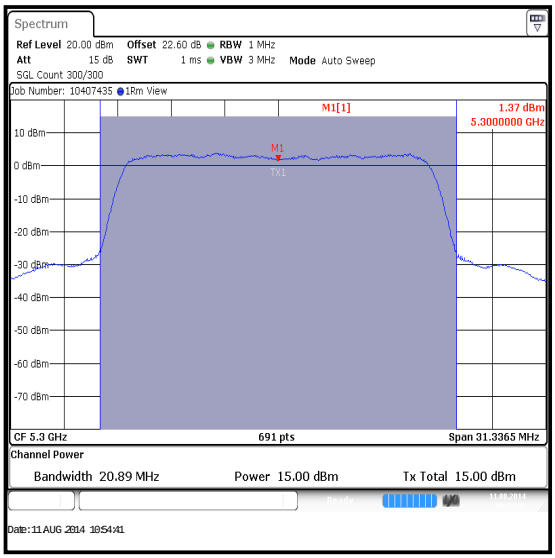
Channel	Frequency (MHz)	Conducted Power Port 1 (dBm)	Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5260	15.4	14.1	17.8	24.0	6.2	Complied
Middle	5300	15.1	14.2	17.7	24.0	6.3	Complied
Top	5320	12.5	11.6	15.1	24.0	8.9	Complied

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

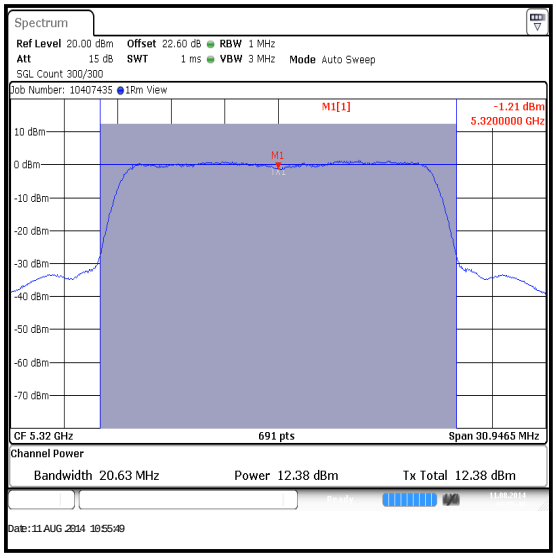
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band / Port 1



Bottom Channel



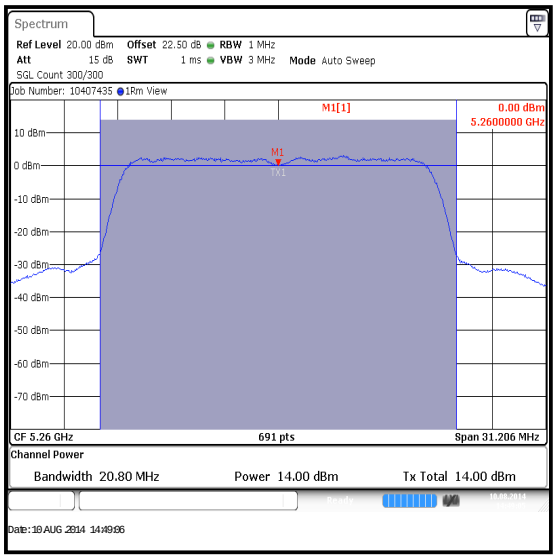
Middle Channel



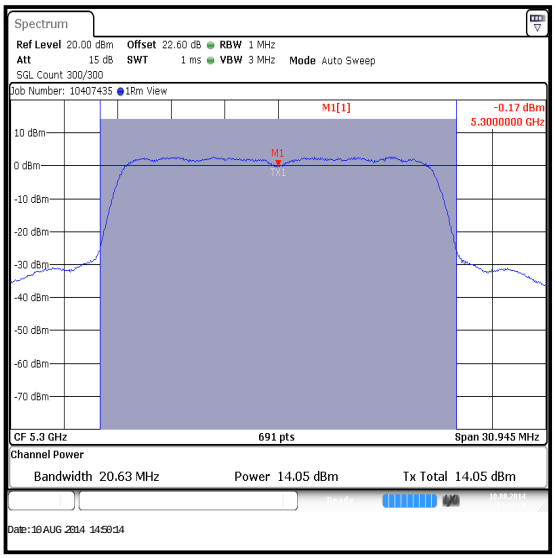
Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

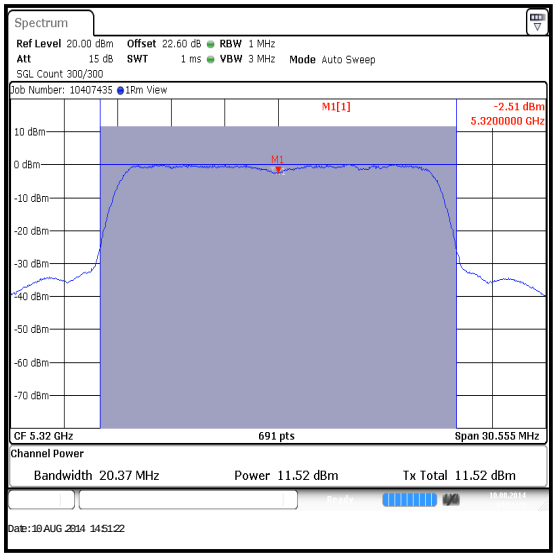
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band / Port 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

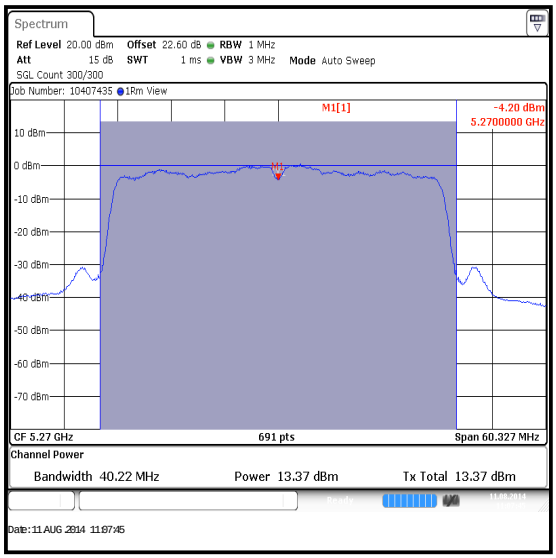
Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	13.4	0.2	13.6	12.6	0.2	12.8
Top	9.0	0.2	9.2	7.7	0.2	7.9

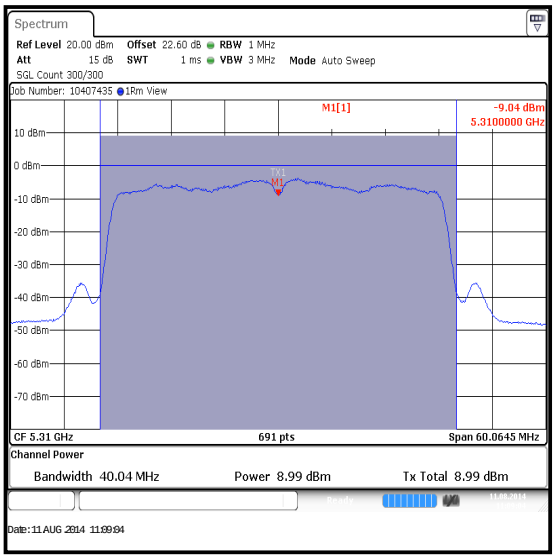
Channel	Frequency (MHz)	Corrected Conducted Power Port 1 (dBm)	Corrected Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5270	13.6	12.8	16.2	24.0	7.8	Complied
Top	5310	9.2	7.9	11.6	24.0	12.4	Complied

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band / Port 1

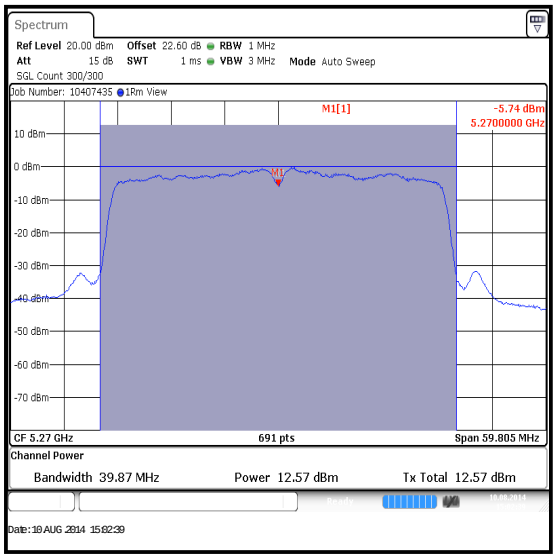


Bottom Channel

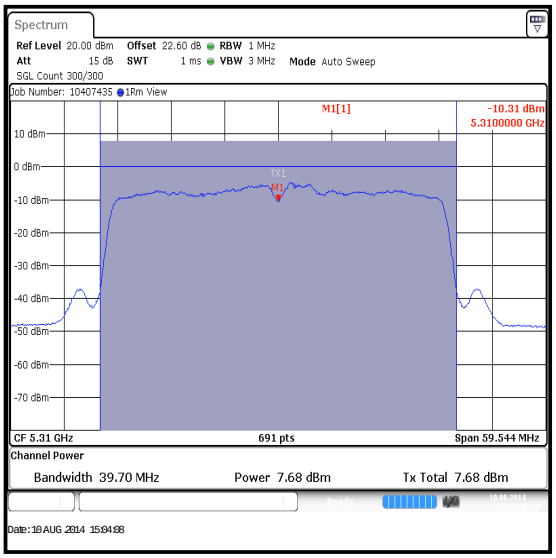


Top Channel

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.25-5.35 GHz band / Port 2



Bottom Channel

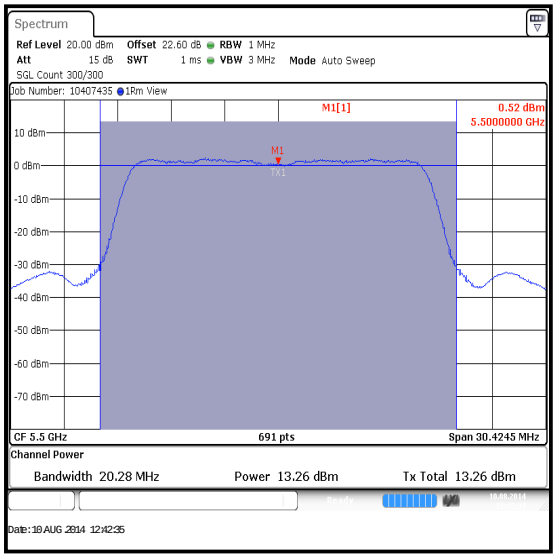


Top Channel

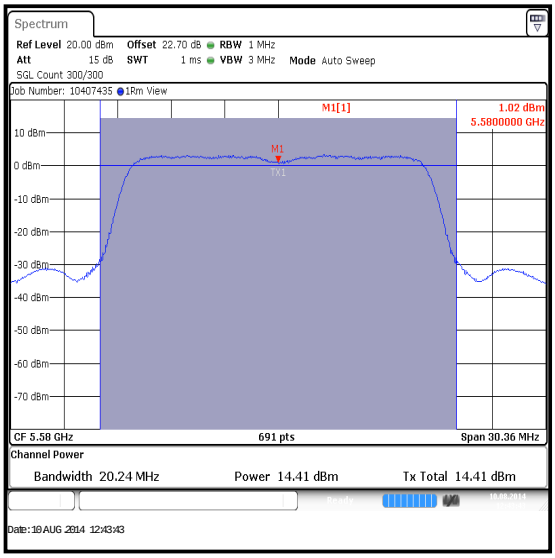
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11a / 20 MHz / BPSK / 6 Mbps / 5.47-5.725 GHz band / Port 1

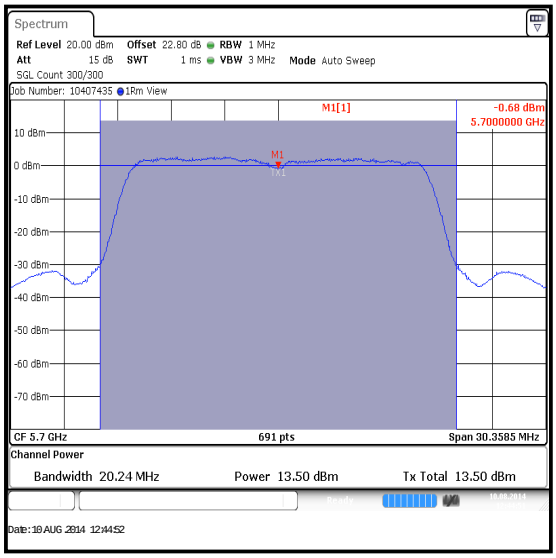
Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5500	13.3	24.0	10.7	Complied
Middle	5580	14.4	24.0	9.6	Complied
Top	5700	13.5	24.0	10.5	Complied



Bottom Channel



Middle Channel

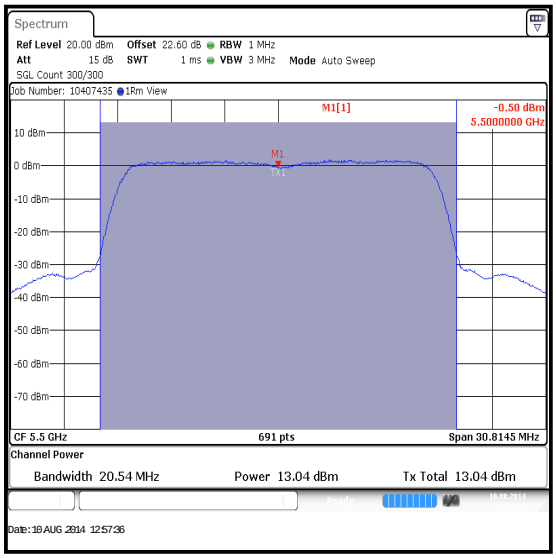


Top Channel

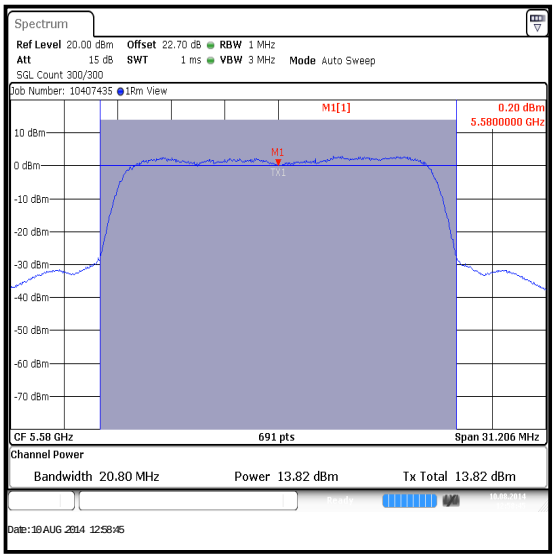
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 20 MHz / BPSK / MCS0 / SISO / 5.47-5.725 GHz band / Port 1

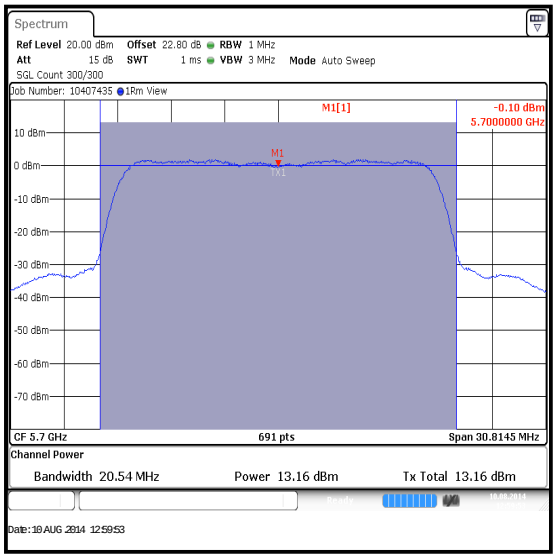
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5500	13.0	0.1	13.1	24.0	10.9	Complied
Middle	5580	13.8	0.1	13.9	24.0	10.1	Complied
Top	5700	13.2	0.1	13.3	24.0	10.7	Complied



Bottom Channel



Middle Channel

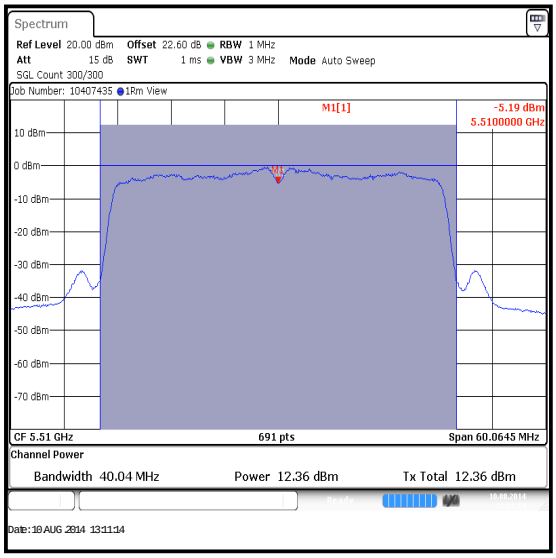


Top Channel

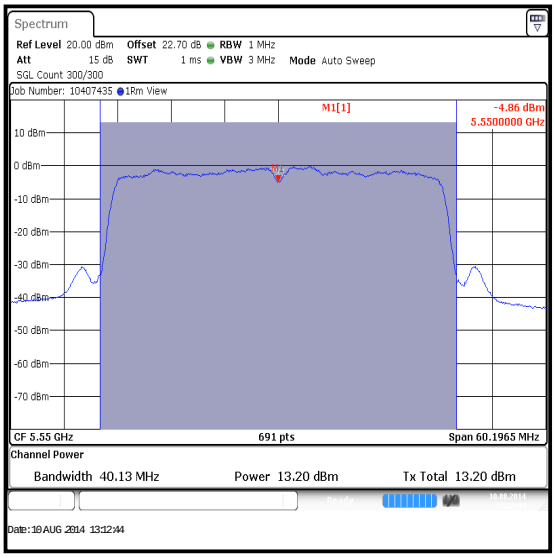
Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / SISO / 5.47-5.725 GHz band / Port 1

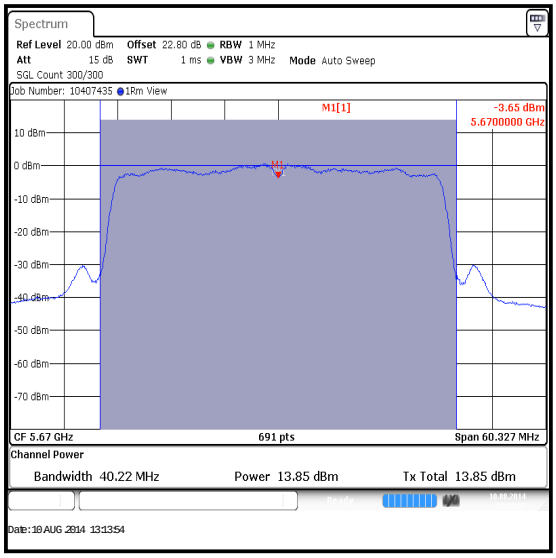
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5510	12.4	0.2	12.6	24.0	11.4	Complied
Middle	5550	13.2	0.2	13.4	24.0	10.6	Complied
Top	5670	13.9	0.2	14.1	24.0	9.9	Complied



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

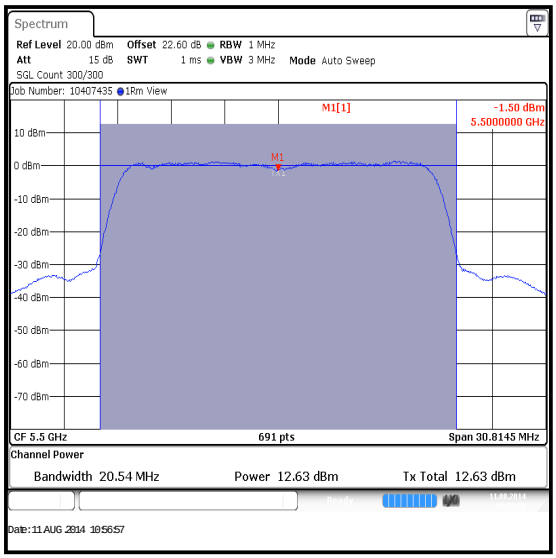
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	12.6	0.1	12.7	11.7	0.1	11.8
Middle	12.4	0.1	12.5	12.1	0.1	12.2
Top	11.8	0.1	11.9	11.1	0.1	11.2

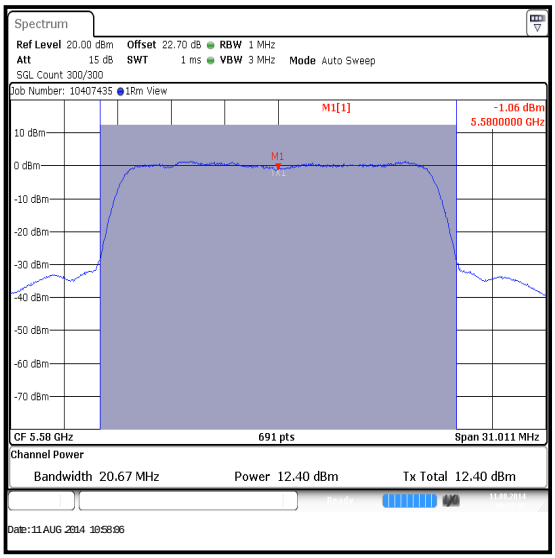
Channel	Frequency (MHz)	Conducted Power Port 1 (dBm)	Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5500	12.7	11.8	15.3	23.6	8.3	Complied
Middle	5580	12.5	12.2	15.4	23.6	8.2	Complied
Top	5700	11.9	11.2	14.6	23.6	9.0	Complied

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

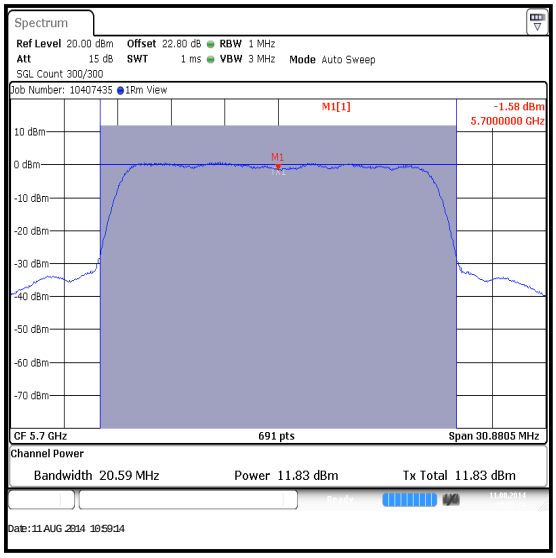
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band / Port 1



Bottom Channel



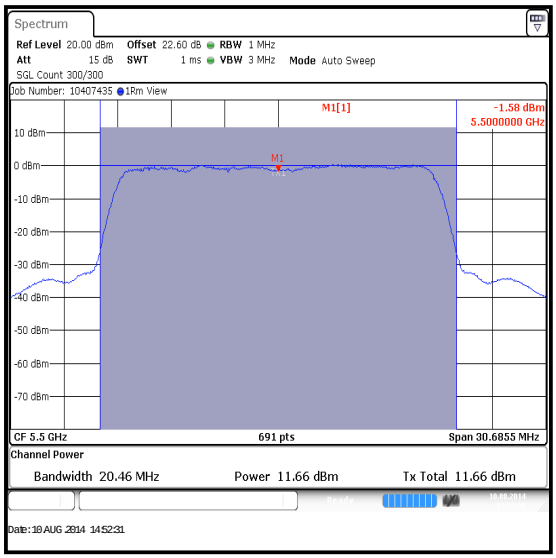
Middle Channel



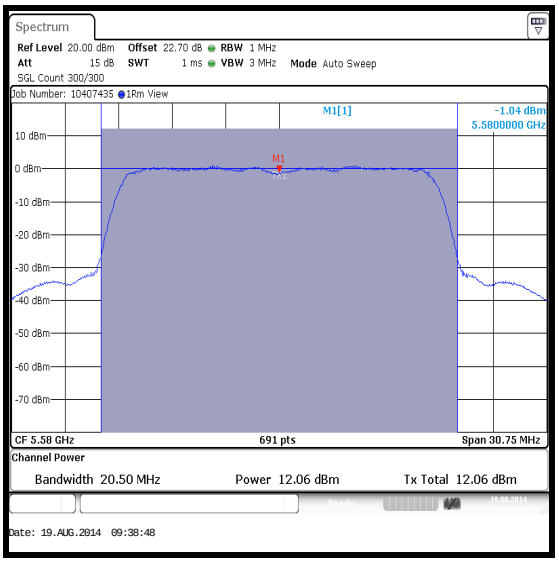
Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

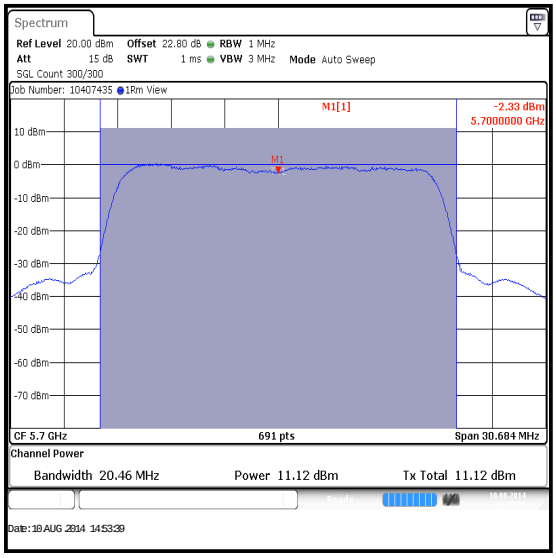
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band / Port 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

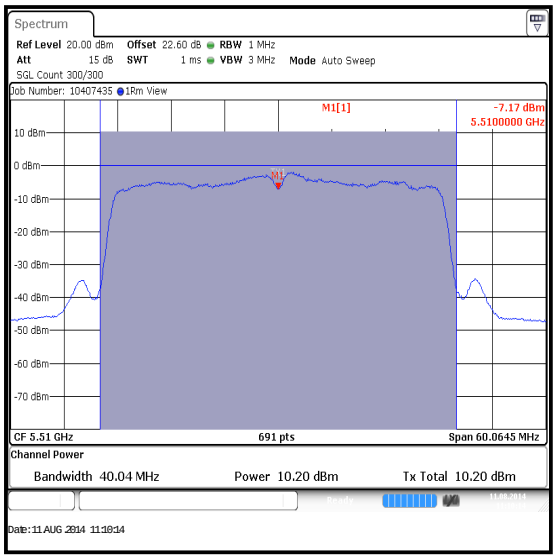
Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	10.2	0.2	10.4	9.2	0.2	9.4
Middle	13.0	0.2	13.2	12.5	0.2	12.7
Top	12.9	0.2	13.1	12.4	0.2	12.6

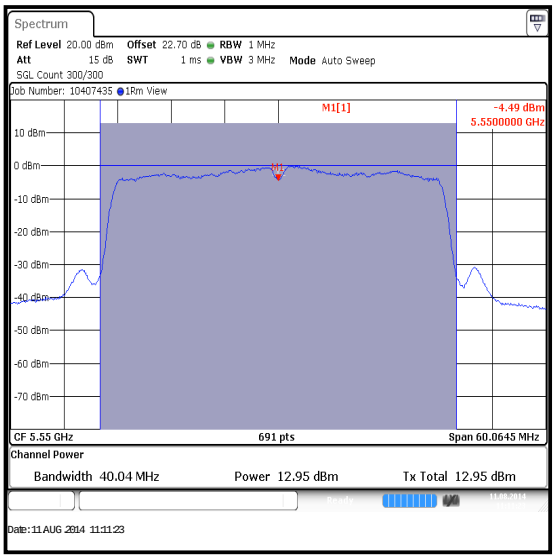
Channel	Frequency (MHz)	Corrected Conducted Power Port 1 (dBm)	Corrected Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5510	10.4	9.4	12.9	23.6	10.7	Complied
Middle	5550	13.2	12.7	16.0	23.6	7.6	Complied
Top	5670	13.1	12.6	15.9	23.6	7.7	Complied

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

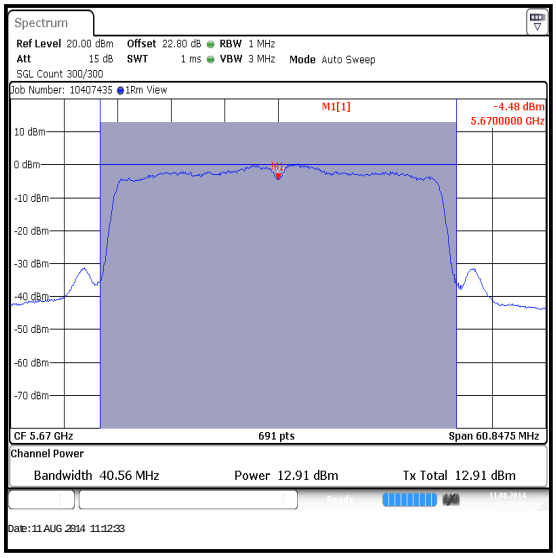
Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band / Port 1



Bottom Channel



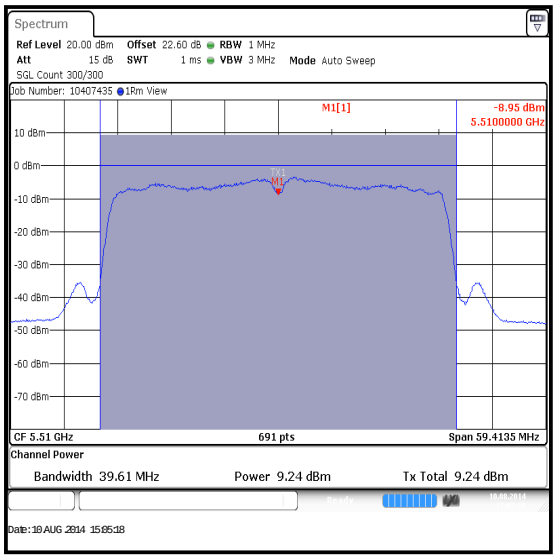
Middle Channel



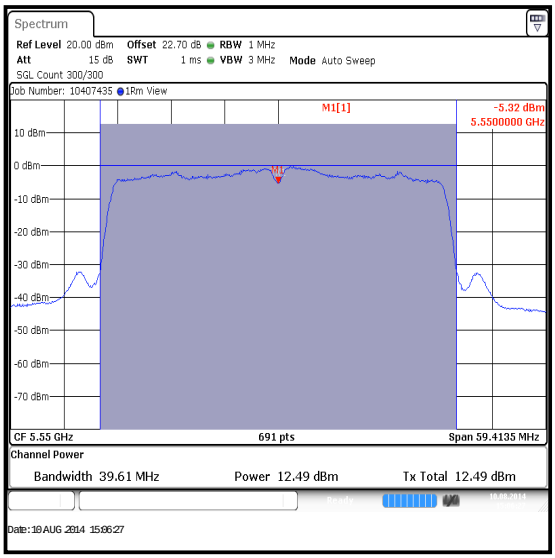
Top Channel

Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

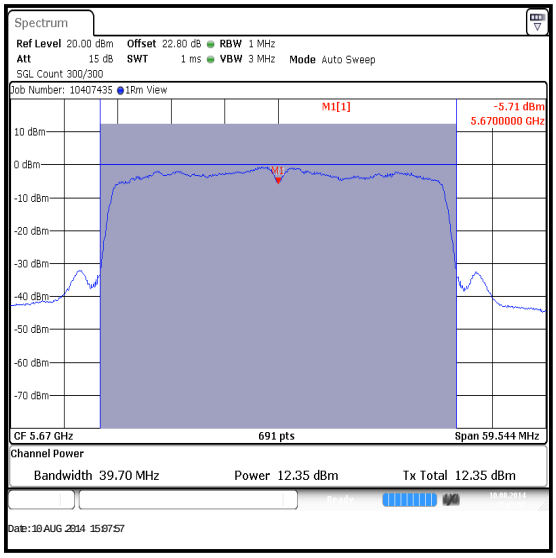
Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / 5.47-5.725 GHz band / Port 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band)

Test Summary:

Test Engineers:	Nick Steele & Georgios Vzeras	**Test Dates:**	10 August 2014 & 11 August 2014
Test Sample IMEI:	352025060506475		

FCC Reference:	Part 15.407(a)(3)
Test Method Used:	As detailed in KDB 789033 D02 Section II.E.2.b) and II.E.2.d)

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	41 to 44

Note(s):

1. The FCC Part 15.407(a)(3) limit shall not exceed 1 W (30.0 dBm).
2. For 802.11n MIMO mode, the data stream is correlated as it is single stream with CDD on. The directional antenna gain has been calculated in accordance with KDB 662911 D01 Section F)2)f)(ii). The EUT antenna has a gain of 2.7 dBi for port 1 and 3.8 dBi for port 2, in the frequency range 5.725 GHz to 5.85 GHz.

$$\text{Directional Gain} = 10\log\left[\frac{\sum_{j=1}^{N_{SS}}\left(\sum_{k=1}^{N_{ANT}} g_{j,k}\right)^2}{N_{ANT}}\right]$$

the equation above gives the following result:

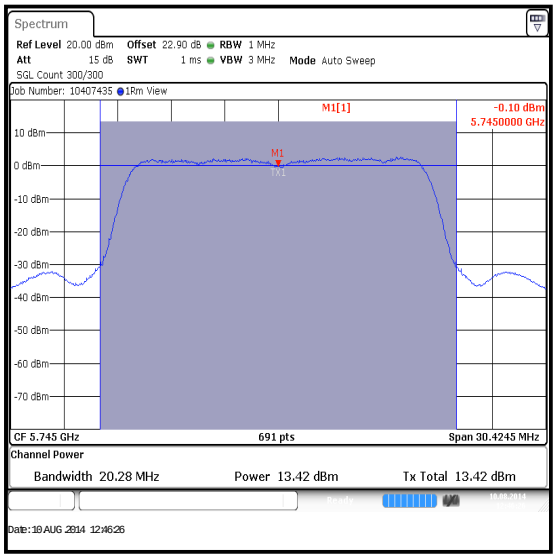
$$\text{Directional Gain} = 10\log\left[\frac{\left(10^{\frac{2.7}{20}} + 10^{\frac{3.8}{20}}\right)^2}{2}\right] = 6.3\ dBi$$

3. For 802.11n MIMO mode, in the 5.725 to 5.85 GHz band, the EUT antenna has a combined gain of 6.3 dBi. In accordance with 15.407(a)(3), the limit was reduced by the amount in dB the antenna gain exceeds 6dBi. Therefore the limit of 30 dBm has been reduced by 0.3 dB to 29.7 dBm.

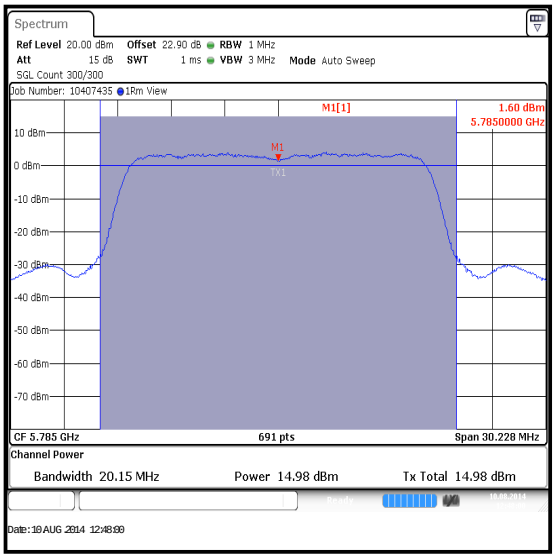
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11a / 20 MHz / BPSK / 6 Mbps / Port 1

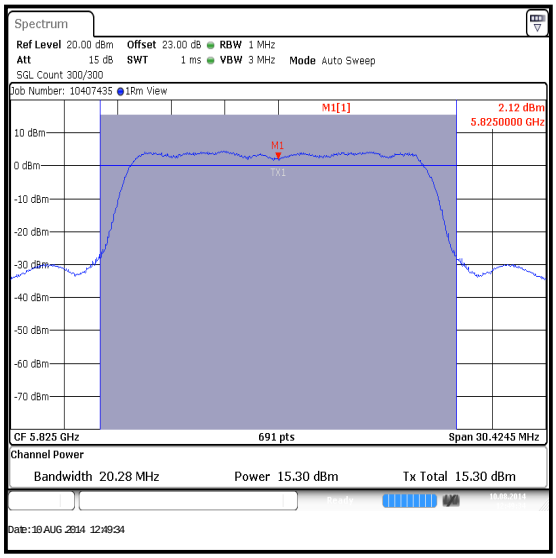
Channel	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	13.4	30.0	16.6	Complied
Middle	5785	15.0	30.0	15.0	Complied
Top	5825	15.3	30.0	14.7	Complied



Bottom Channel



Middle Channel

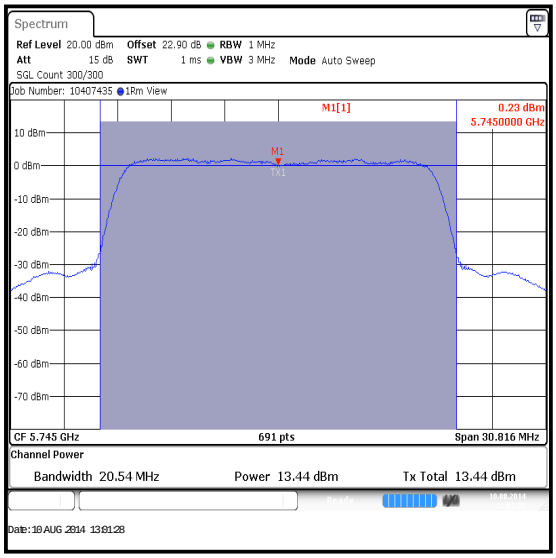


Top Channel

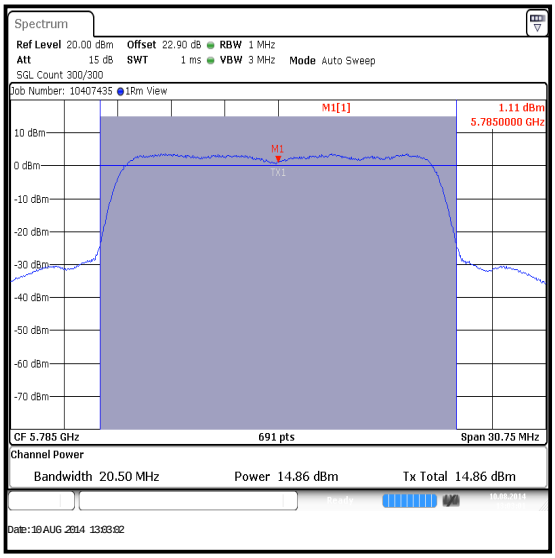
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / BPSK / MCS0 / SISO / Port 1

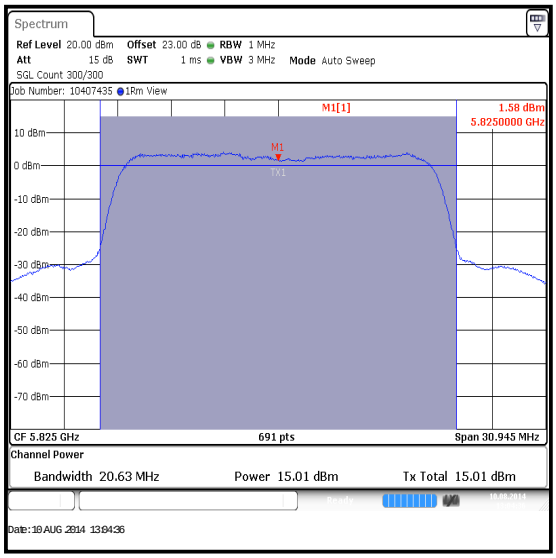
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	13.4	0.1	13.5	30.0	16.5	Complied
Middle	5785	14.9	0.1	15.0	30.0	15.0	Complied
Top	5825	15.0	0.1	15.1	30.0	14.9	Complied



Bottom Channel



Middle Channel

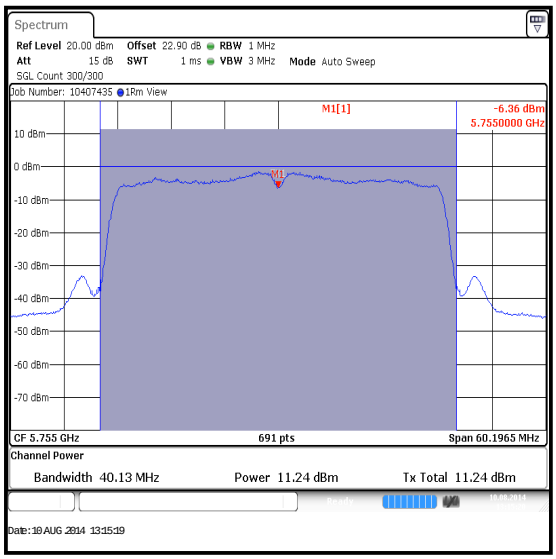


Top Channel

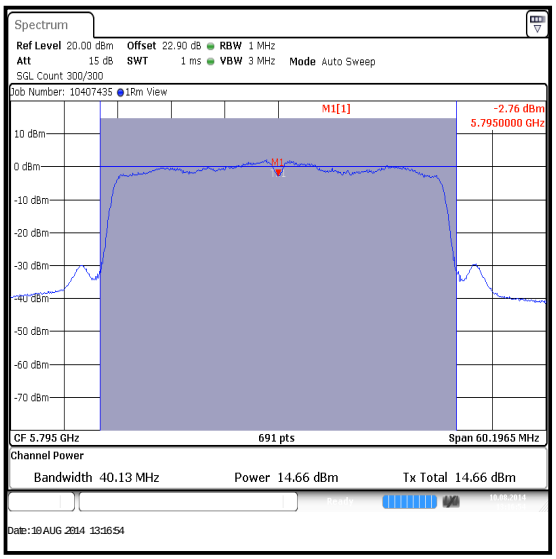
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / SISO / Port 1

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5755	11.2	0.2	11.4	30.0	18.6	Complied
Top	5795	14.7	0.2	14.9	30.0	15.1	Complied



Bottom Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

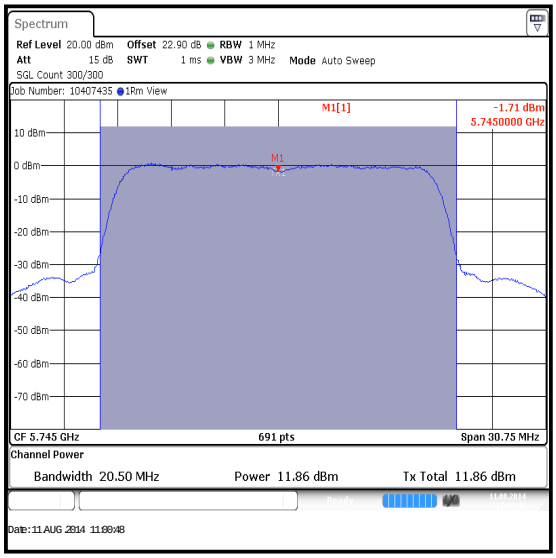
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	11.9	0.1	12.0	11.3	0.1	11.4
Middle	14.8	0.1	14.9	14.1	0.1	14.2
Top	14.7	0.1	14.8	14.2	0.1	14.3

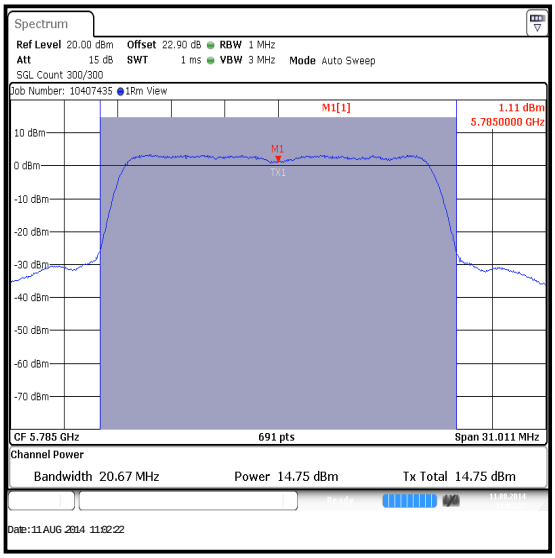
Channel	Frequency (MHz)	Conducted Power Port 1 (dBm)	Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	12.0	11.4	14.7	29.7	15.0	Complied
Middle	5785	14.9	14.2	17.6	29.7	12.1	Complied
Top	5825	14.8	14.3	17.6	29.7	12.1	Complied

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

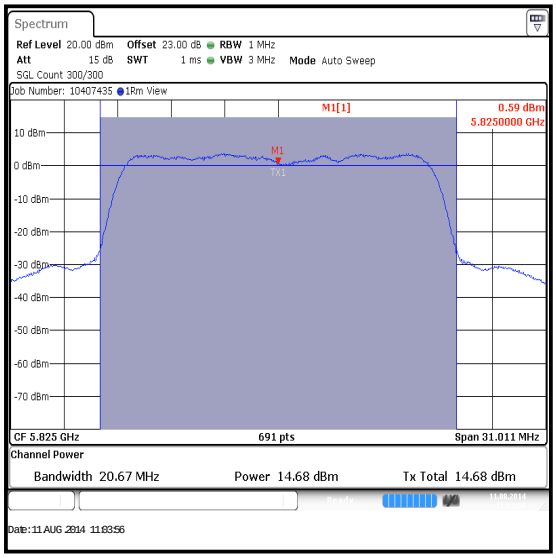
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / Port 1



Bottom Channel



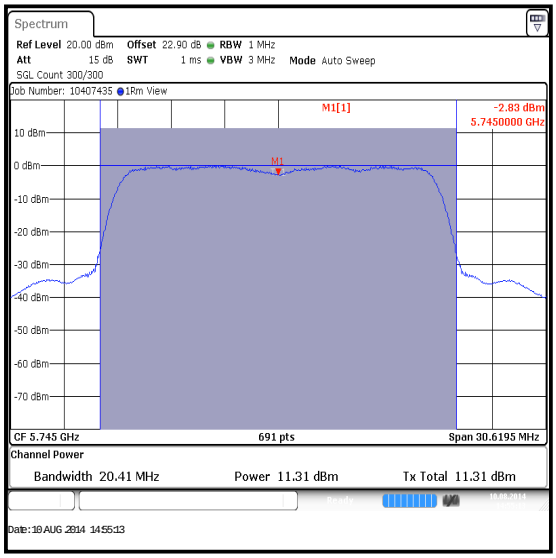
Middle Channel



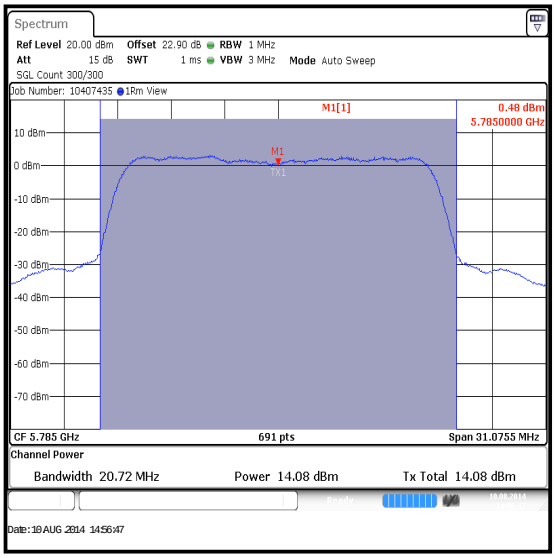
Top Channel

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

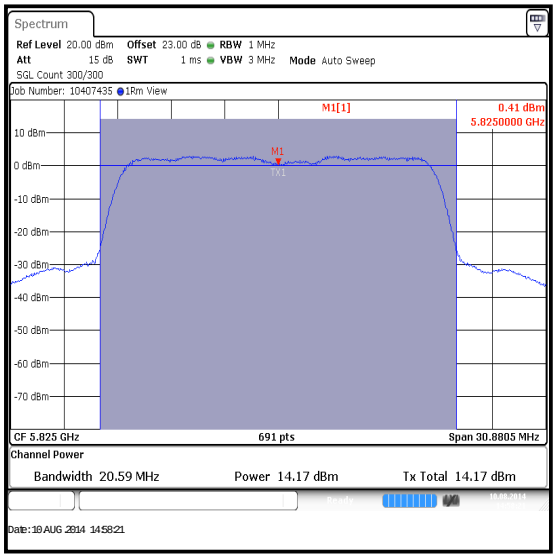
Results: 802.11n / 20 MHz / BPSK / MCS0 / MIMO / Port 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

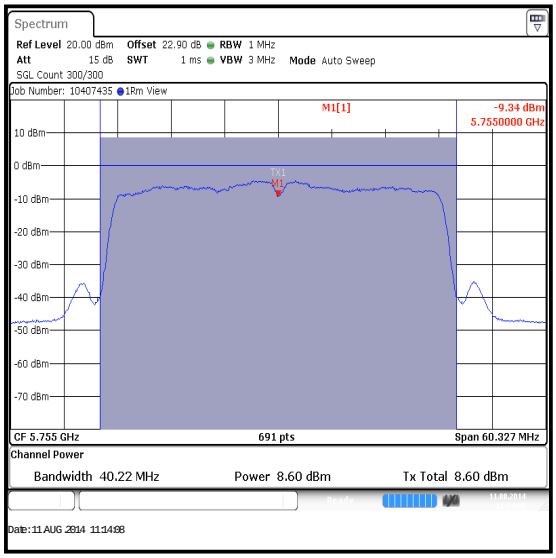
Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO

Channel	Port 1			Port 2		
	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty Cycle Correction (dB)	Corrected Conducted Power (dBm)
Bottom	8.6	0.2	8.8	8.2	0.2	8.4
Top	13.4	0.2	13.6	13.0	0.2	13.2

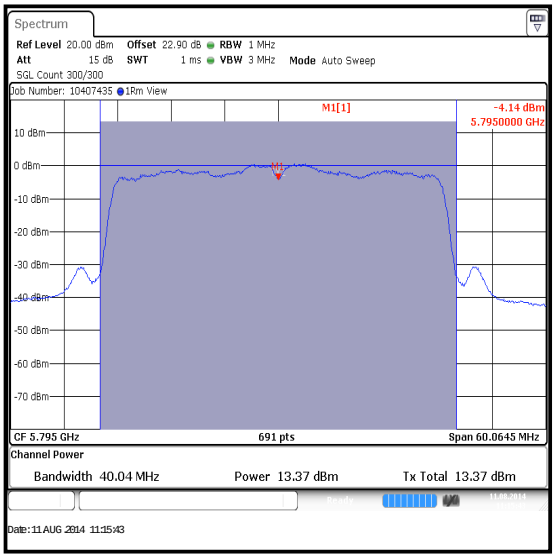
Channel	Frequency (MHz)	Corrected Conducted Power Port 1 (dBm)	Corrected Conducted Power Port 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5755	8.8	8.4	11.6	29.7	18.1	Complied
Top	5795	13.6	13.2	16.4	29.7	13.3	Complied

Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / Port 1

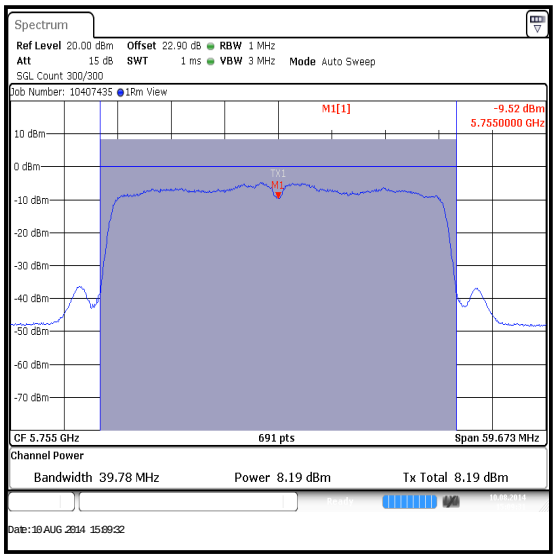


Bottom Channel

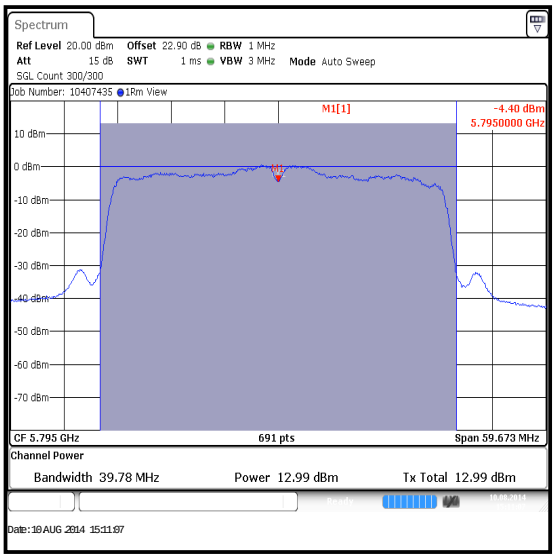


Top Channel

Results: 802.11n / 40 MHz / BPSK / MCS0 / MIMO / Port 2



Bottom Channel



Top Channel

Transmitter Maximum Conducted Output Power (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1658	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
M1873	Signal Analyser	Rohde & Schwarz	FSV30	103074	15 May 2015	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	Calibrated before use	-
S0558	DC Power Supply	TTI	EL 303R	395825	Calibrated before use	-
M1251	Multimeter	Fluke	175	89170179	19 May 2015	12
G0608	Signal Generator	Rohde & Schwarz	SMIQ 06B	838341/033	14 Feb 2015	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	08 Apr 2016	24
M1267	Power Sensor	Rohde & Schwarz	NRV-Z52	100155	23 Apr 2016	24