

5.2.5. Transmitter Peak Power Spectral Density**Test Summary:**

Test Engineer:	Nick Steele	Test Dates:	22 July 2013 & 23 July 2013
Test Sample IMEI:	004402451246254		

FCC Reference:	Part 15.407(a)(1)
Test Method Used:	As detailed in FCC KDB 789033 F) referencing KDB 789033 E)2)e)

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	38 to 41

Note(s):

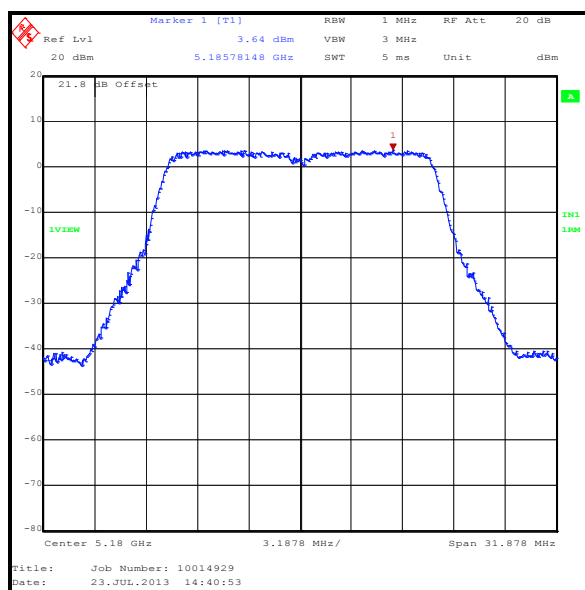
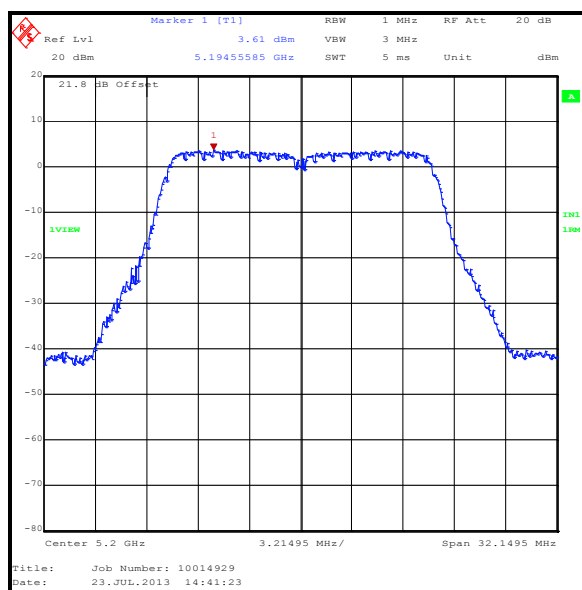
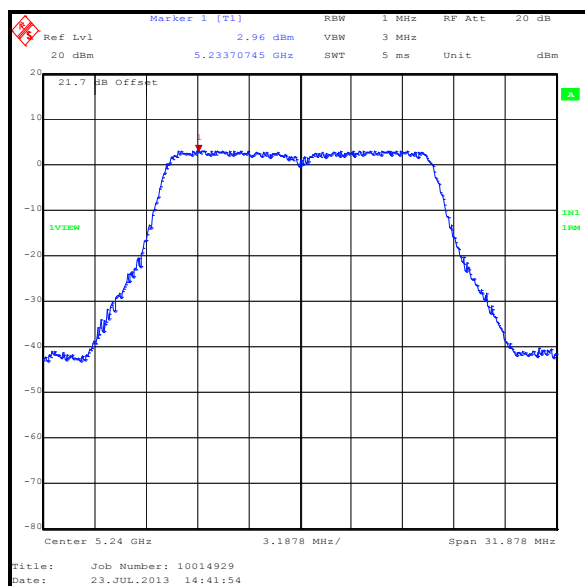
1. Transmitter Peak Power Spectral Density tests in all bands were performed using a test receiver in accordance with FCC KDB 789033 E)2)e) Method SA-2 Alternative.
2. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and therefore deemed worst case were:
 - 802.11a – 64QAM / 54 Mbps
 - 802.11n HT20 – 16QAM / 28.9 Mbps / MCS3 (GI = 400 ns)
 - 802.11n HT40 – QPSK / 27 Mbps / MCS1 (GI = 800 ns)
 - 802.11ac VHT20 – BPSK / 7.2 Mbps / MCS0 (GI = 400 ns)
 - 802.11ac VHT40 – 64QAM / 120 Mbps / MCS5 (GI = 400 ns)
 - 802.11ac VHT80 – 64QAM / 325 Mbps / MCS7 (GI = 400 ns)

Measurements were then performed in these modes on bottom, middle and top channels in all operating bands.

3. For data rates where the EUT was transmitting at <98% duty cycle. The calculated duty cycle in section 5.2.3 was added to the measured peak power spectral density in order to compute the average peak power spectral density during the actual transmission time.
4. The EUT antenna has a gain of <6 dBi.
5. The test receiver was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the test receiver to compensate for the loss of the attenuator and RF cable.

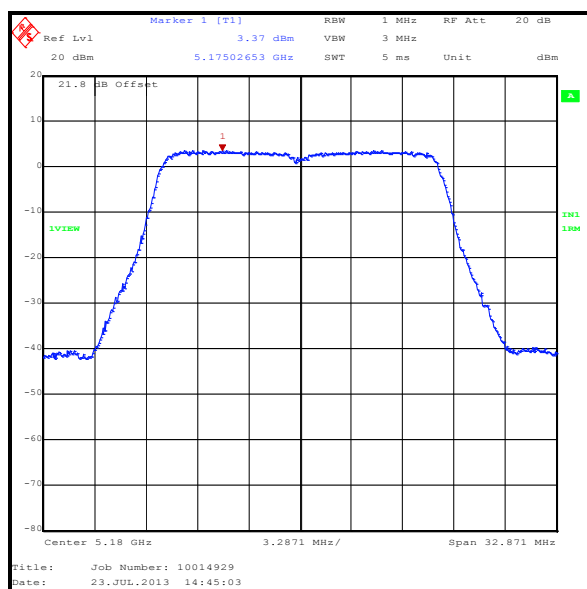
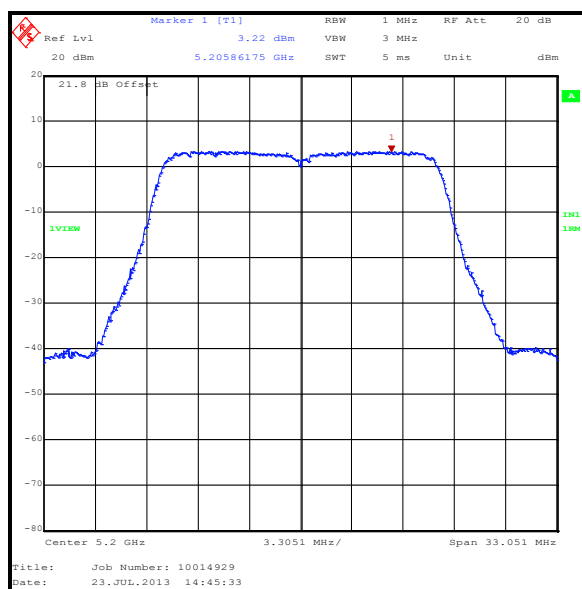
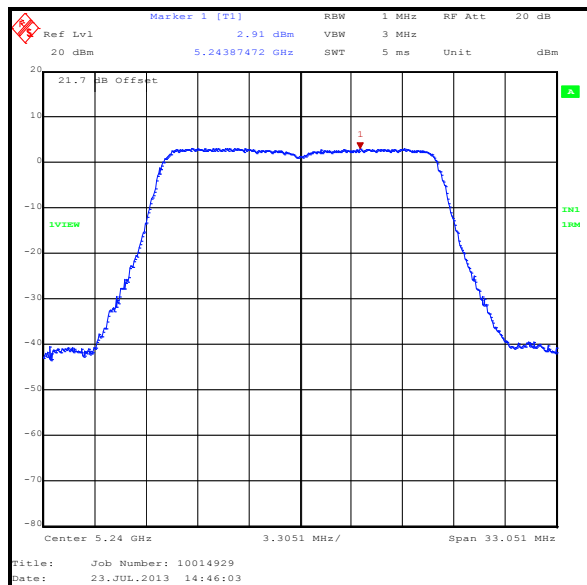
Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11a / 20 MHz / 64QAM / 54 Mbps**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	3.6	0.2	3.8	4.0	0.2	Complied
Middle	5200	3.6	0.2	3.8	4.0	0.2	Complied
Top	5240	3.0	0.2	3.2	4.0	0.8	Complied

**Bottom Channel****Middle Channel****Top Channel**

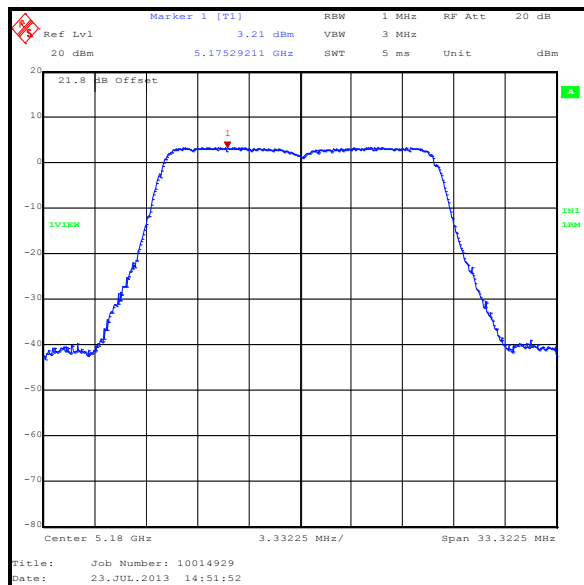
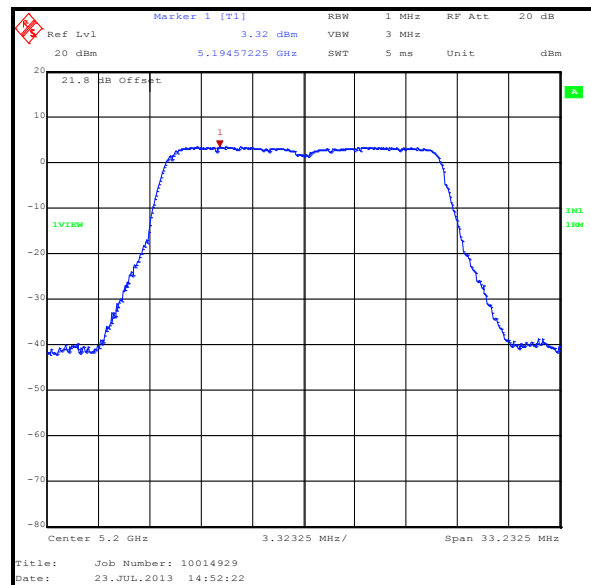
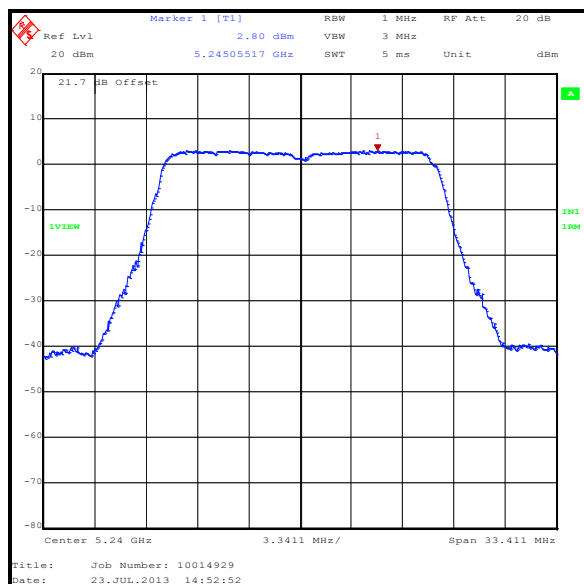
Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11n / 20 MHz / 16QAM / 28.9 Mbps / MCS3**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	3.4	4.0	0.6	Complied
Middle	5200	3.2	4.0	0.8	Complied
Top	5240	2.9	4.0	1.1	Complied

**Bottom Channel****Middle Channel****Top Channel**

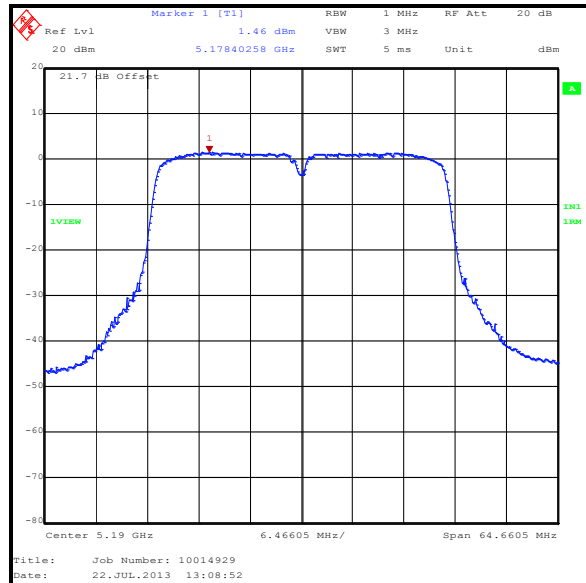
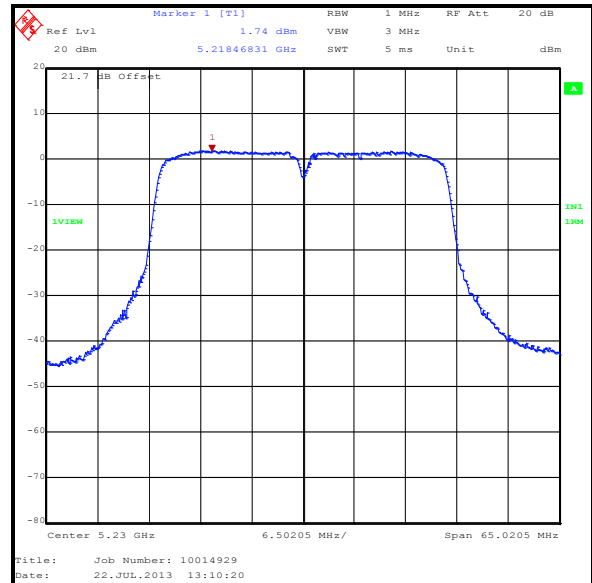
Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	3.2	4.0	0.8	Complied
Middle	5200	3.3	4.0	0.7	Complied
Top	5240	2.8	4.0	1.2	Complied

**Bottom Channel****Middle Channel****Top Channel**

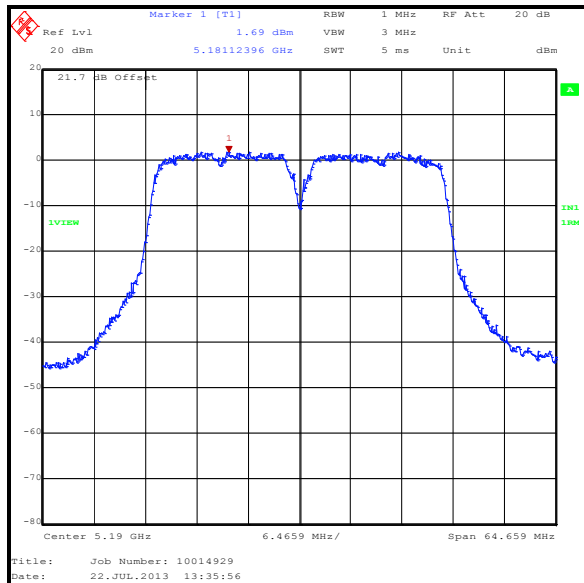
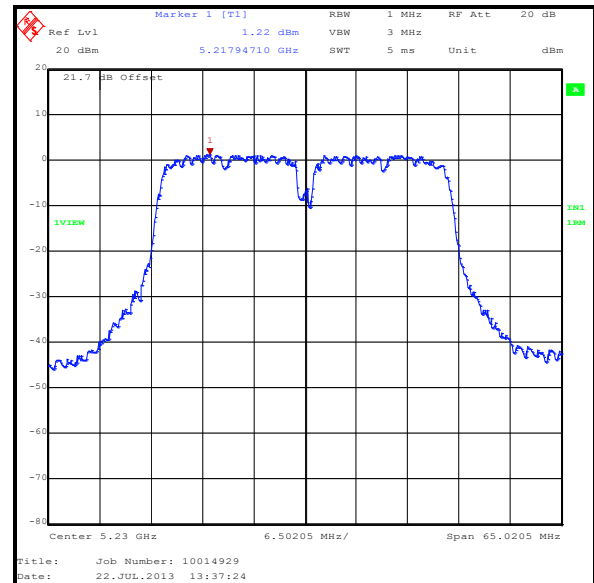
Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	1.5	4.0	2.5	Complied
Top	5230	1.7	4.0	2.3	Complied

**Bottom Channel****Top Channel**

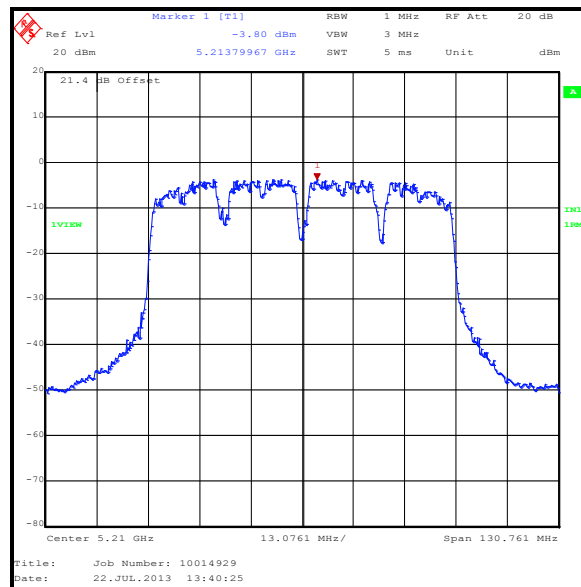
Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	1.7	0.4	2.1	4.0	1.9	Complied
Top	5230	1.2	0.4	1.6	4.0	2.4	Complied

**Bottom Channel****Top Channel**

Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (continued)**Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Single	5210	-3.8	0.6	-3.2	4.0	7.2	Complied

**Single Channel**

Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)**Test Summary:**

Test Engineer:	Nick Steele	Test Dates:	22 July 2013 & 23 July 2013
Test Sample IMEI:	004402451246254		

FCC Reference:	Part 15.407(a)(2)
Test Method Used:	As detailed in FCC KDB 789033 F) referencing KDB 789033 E)2)e)

Environmental Conditions:

Temperature (°C):	24 to 25
Relative Humidity (%):	38 to 41

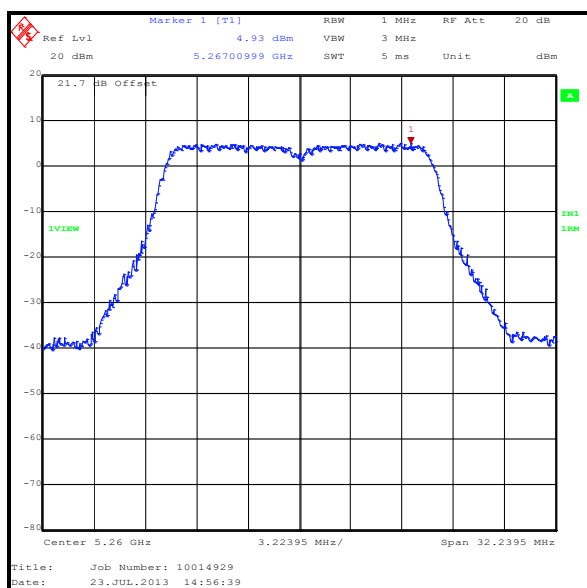
Note(s):

1. FCC Part 15.407(a)(2) limit for PPSD in the 5.25-5.35 GHz and 5.47-5.725 GHz operating bands is <11 dBm/MHz.

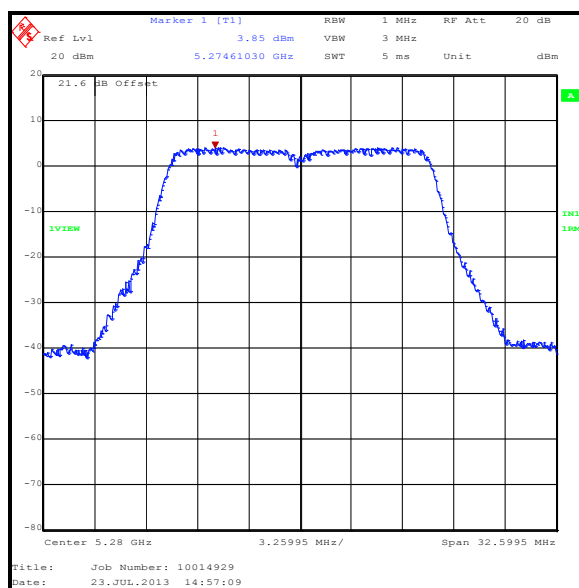
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) **(continued)**

Results: 802.11a / 20 MHz / 64QAM / 54 Mbps / 5.25-5.35 GHz band

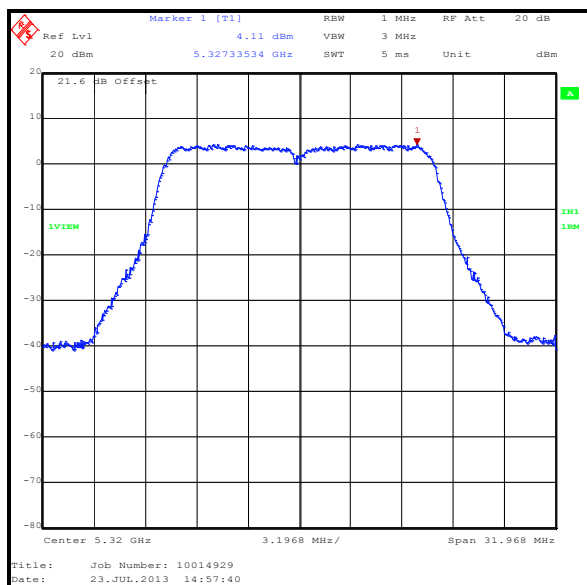
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5260	4.9	0.2	5.1	11.0	5.9	Complied
Middle	5280	3.9	0.2	4.1	11.0	6.9	Complied
Top	5320	4.1	0.2	4.3	11.0	6.7	Complied



Bottom Channel



Middle Channel

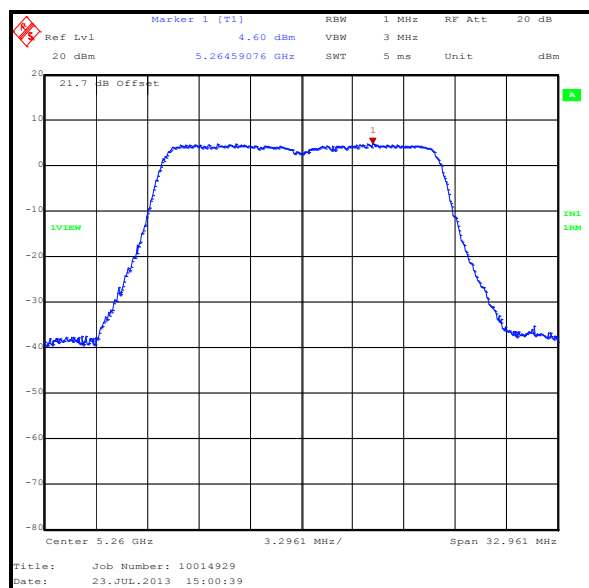


Top Channel

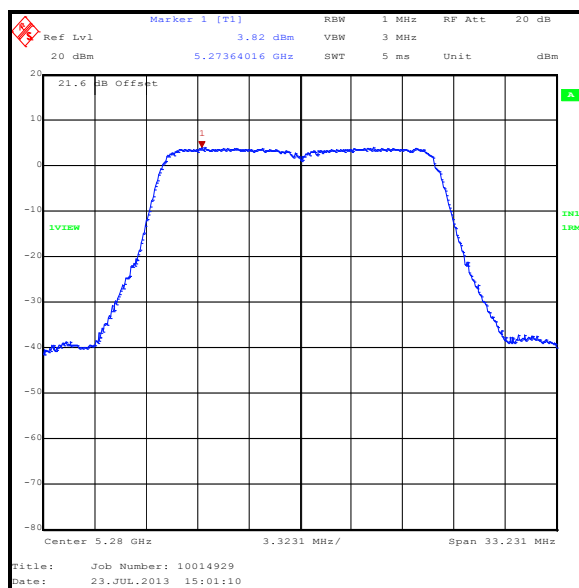
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 20 MHz / 16QAM / 28.9 Mbps / MCS3/ 5.25-5.35 GHz band

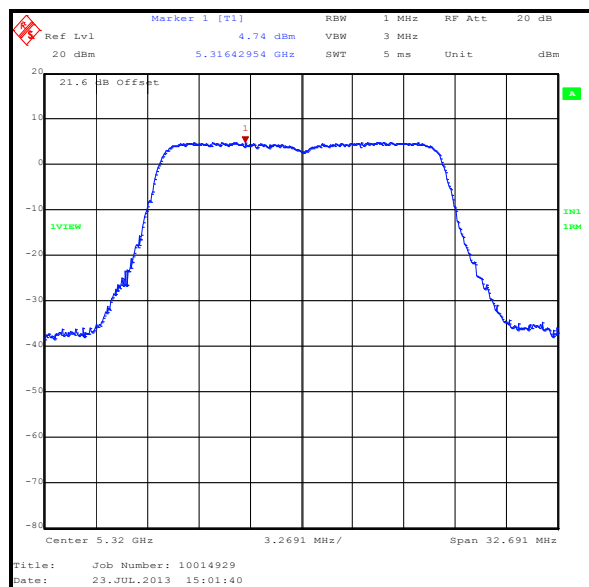
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5260	4.6	11.0	6.4	Complied
Middle	5280	3.8	11.0	7.2	Complied
Top	5320	4.7	11.0	6.3	Complied



Bottom Channel



Middle Channel

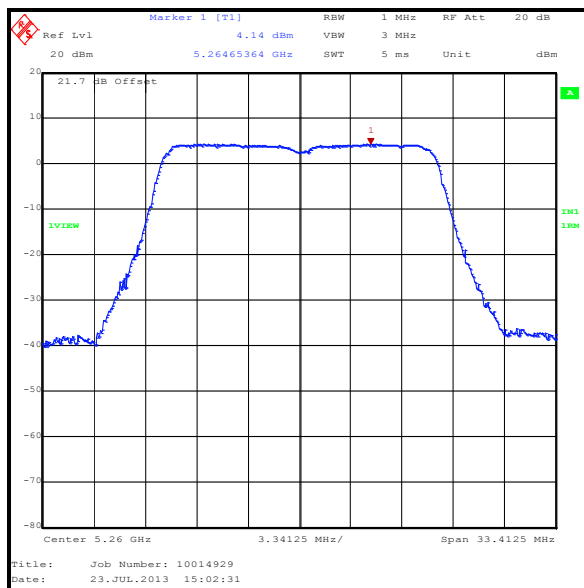


Top Channel

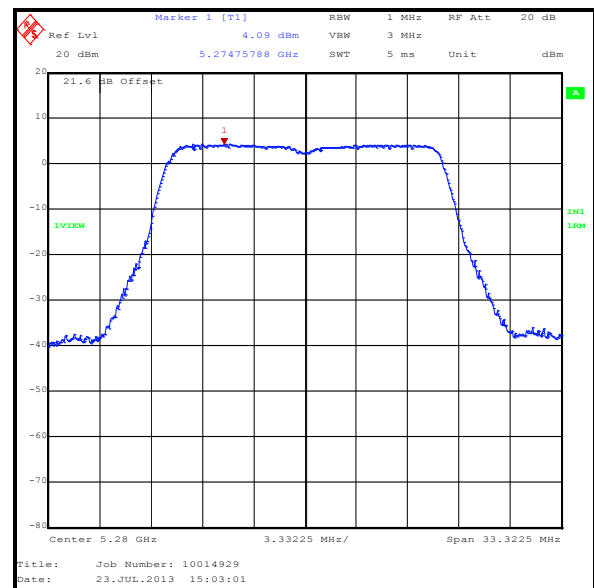
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / 5.25-5.35 GHz band

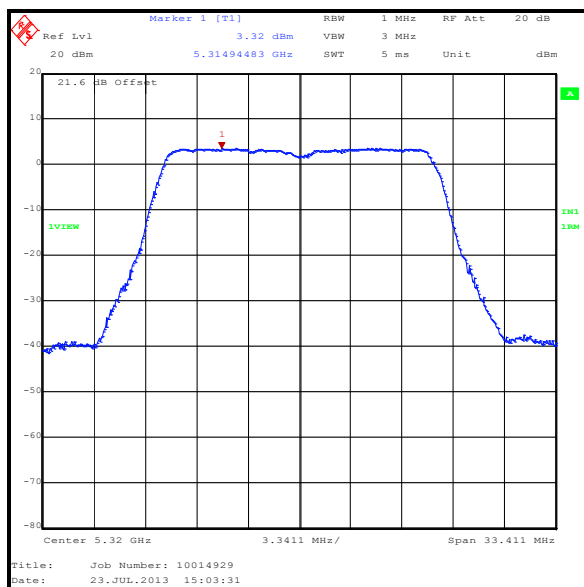
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5260	4.1	11.0	6.9	Complied
Middle	5280	4.1	11.0	6.9	Complied
Top	5320	3.3	11.0	7.7	Complied



Bottom Channel



Middle Channel

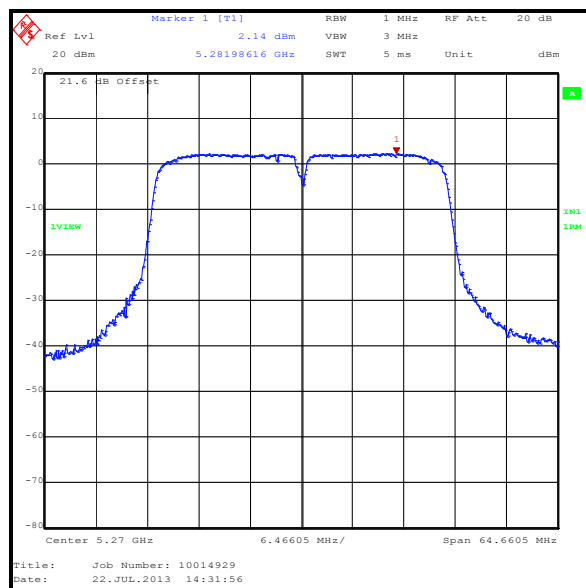


Top Channel

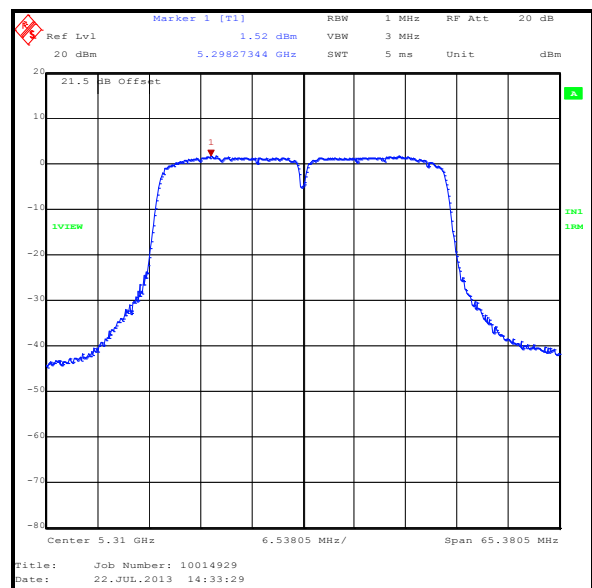
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) **(continued)**

Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / 5.25-5.35 GHz band

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5270	2.1	11.0	8.9	Complied
Top	5310	1.5	11.0	9.5	Complied



Bottom Channel

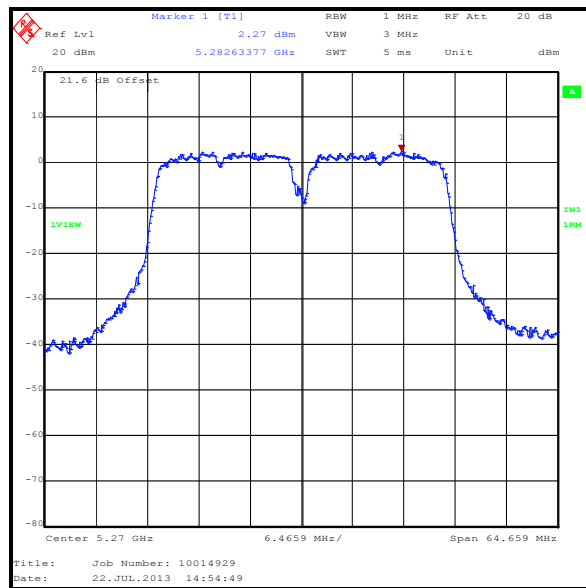


Top Channel

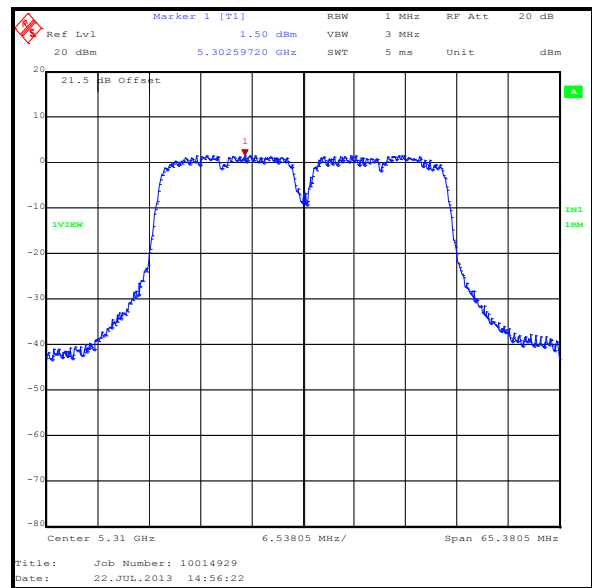
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / 5.25-5.35 GHz band

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5270	2.3	0.4	2.7	11.0	8.3	Complied
Top	5310	1.5	0.4	1.9	11.0	9.1	Complied



Bottom Channel

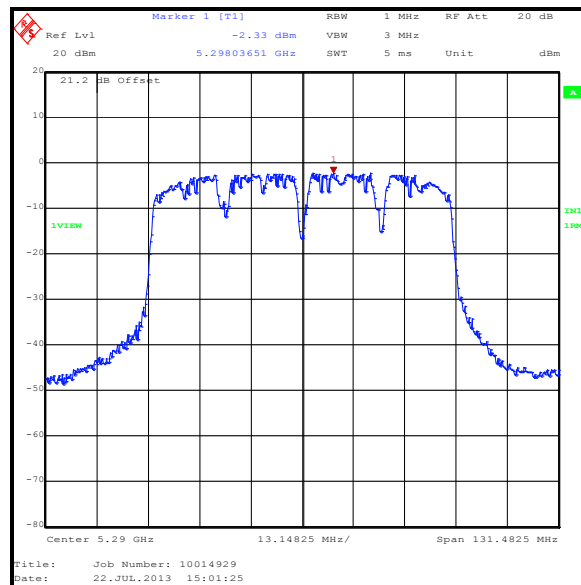


Top Channel

Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)
(continued)

Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7/ 5.25-5.35 GHz band

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Single	5290	-2.3	0.6	-1.7	11.0	12.7	Complied



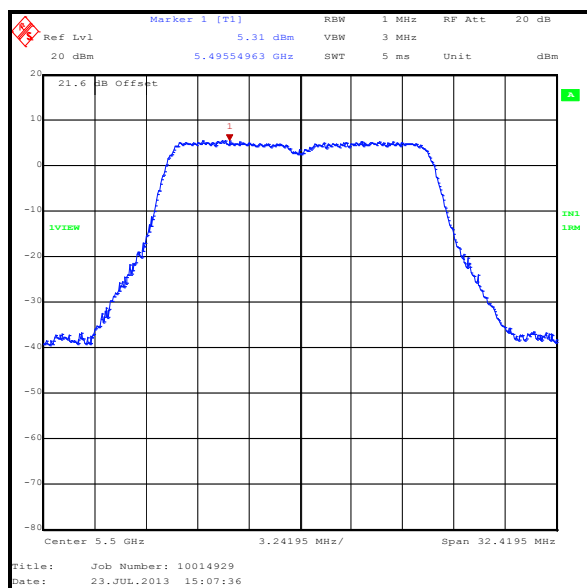
Single Channel

Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)

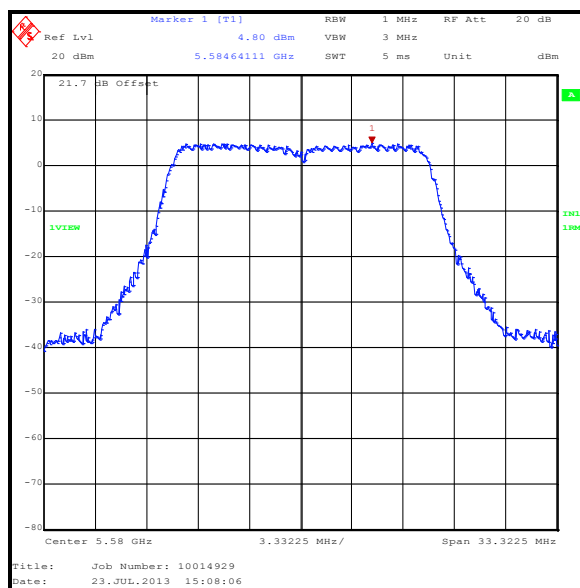
(continued)

Results: 802.11a / 20 MHz / 64QAM / 54 Mbps / 5.47-5.725 GHz band

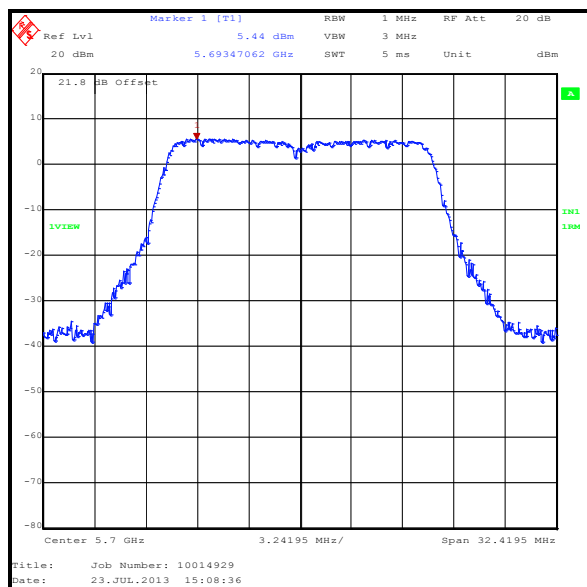
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5500	5.3	11.0	5.7	Complied
Middle	5580	4.8	11.0	6.2	Complied
Top	5700	5.4	11.0	5.6	Complied



Bottom Channel



Middle Channel

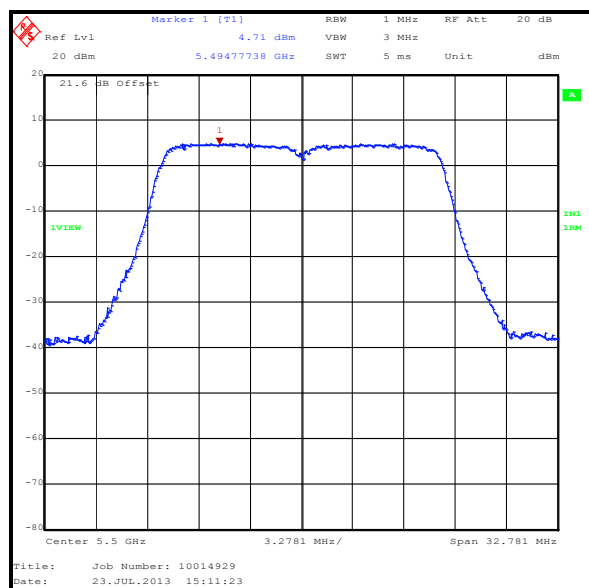


Top Channel

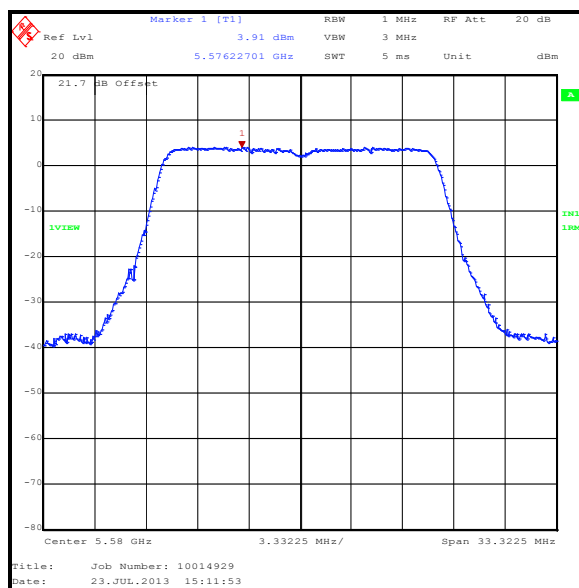
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 20 MHz / 16QAM / 28.9 Mbps / MCS3 / 5.47-5.725 GHz band

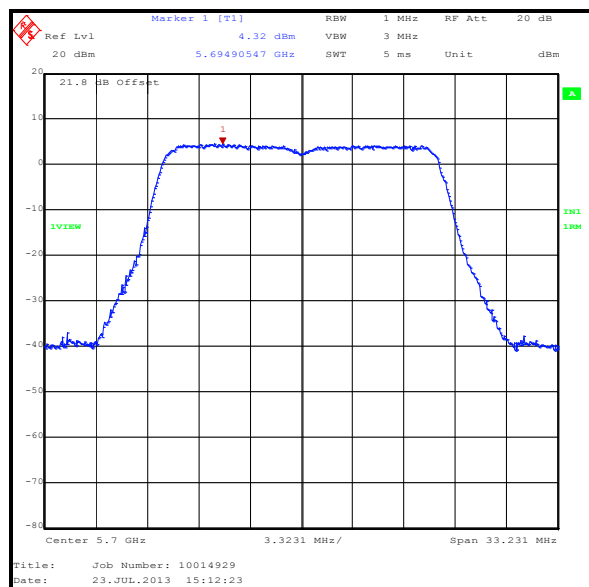
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5500	4.7	11.0	6.3	Complied
Middle	5580	3.9	11.0	7.1	Complied
Top	5700	4.3	11.0	6.7	Complied



Bottom Channel



Middle Channel

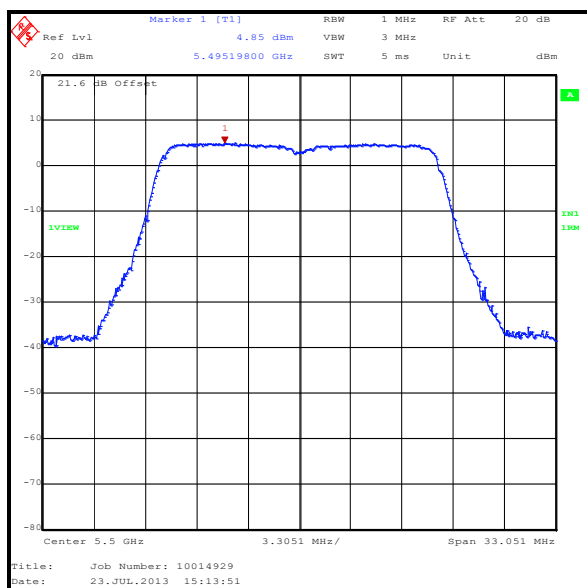


Top Channel

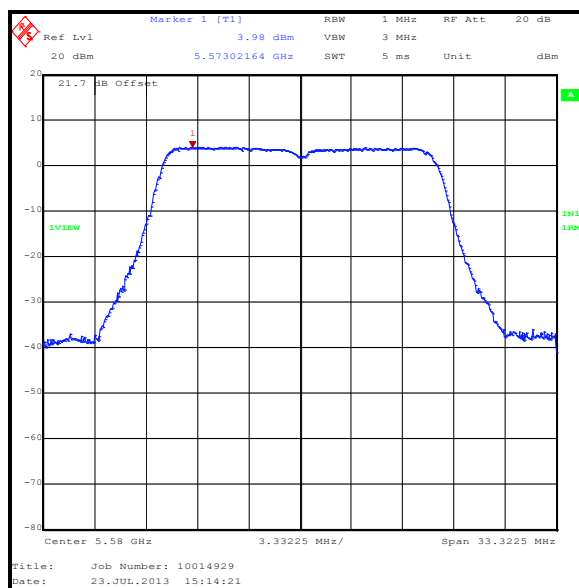
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)

Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / 5.47-5.725 GHz band

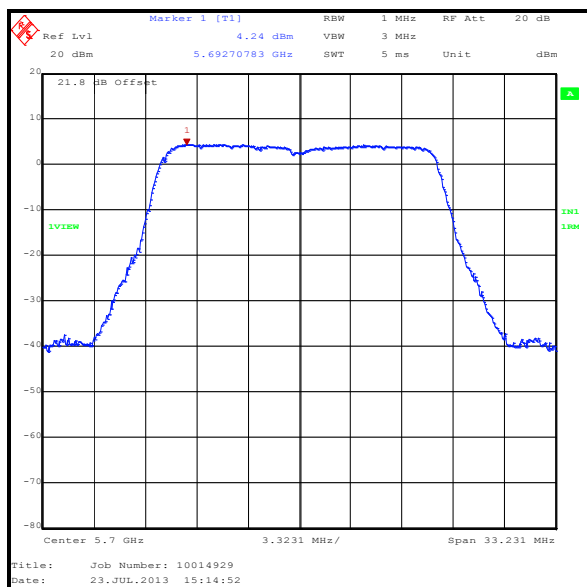
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5500	4.9	11.0	6.1	Complied
Middle	5580	4.0	11.0	7.0	Complied
Top	5700	4.2	11.0	6.8	Complied



Bottom Channel



Middle Channel

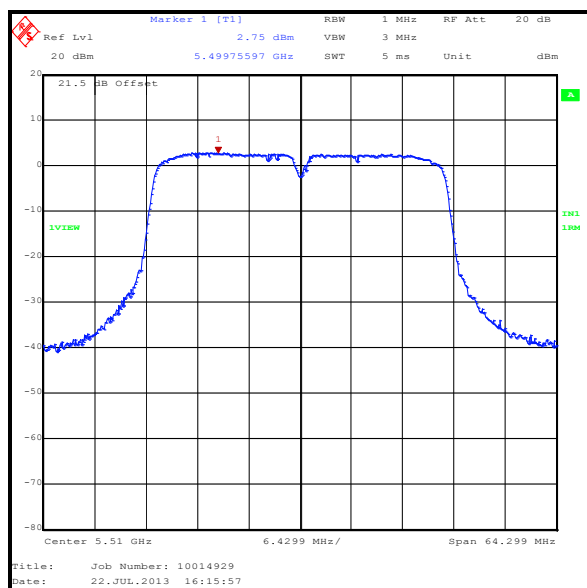


Top Channel

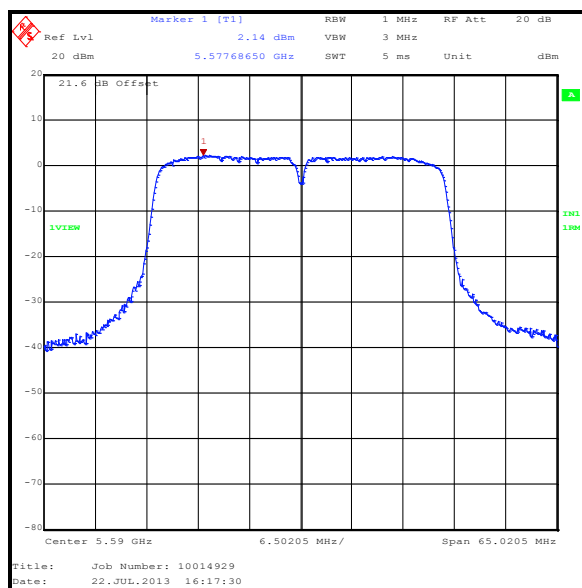
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (continued)

Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / 5.47-5.725 GHz band

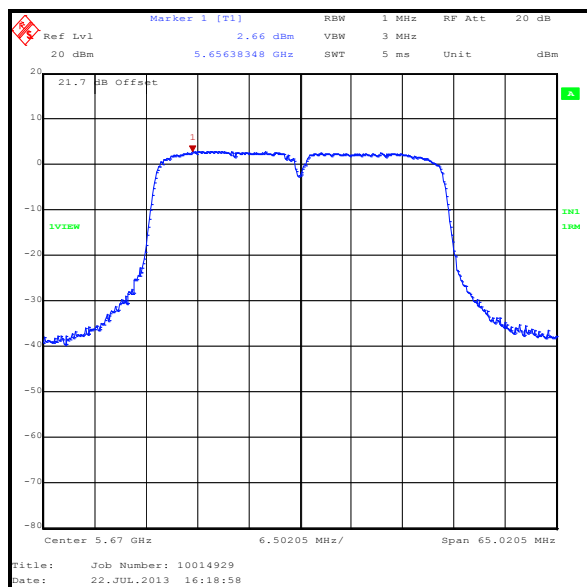
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5510	2.8	11.0	8.2	Complied
Middle	5590	2.1	11.0	8.9	Complied
Top	5670	2.7	11.0	8.3	Complied



Bottom Channel



Middle Channel

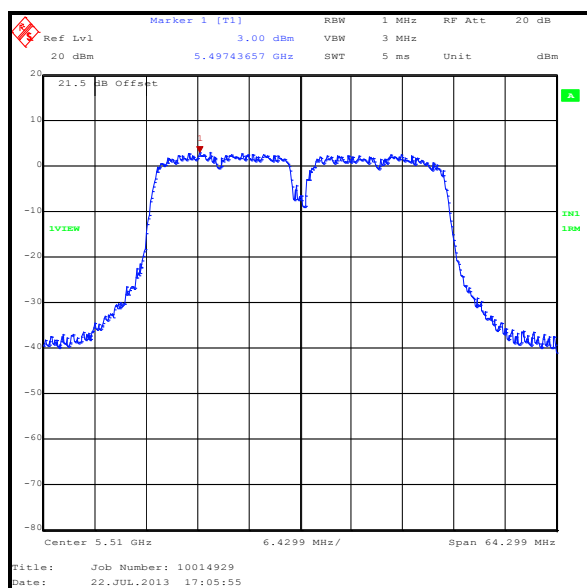


Top Channel

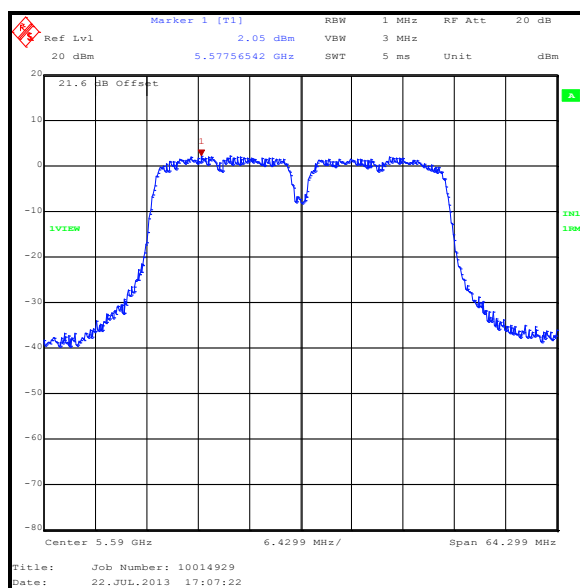
Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) **(continued)**

Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / 5.47-5.725 GHz band

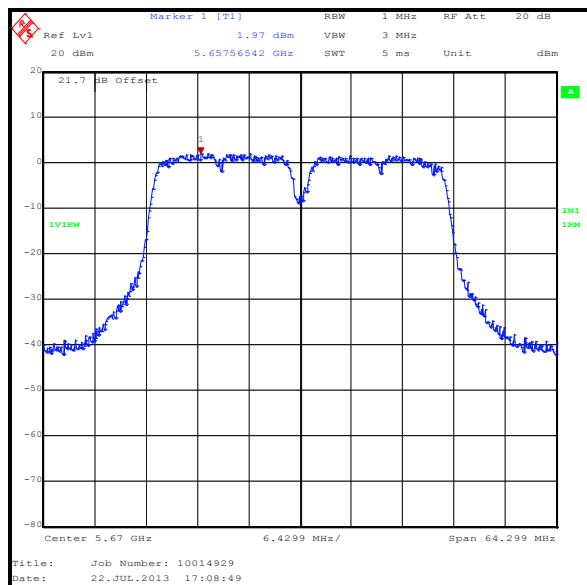
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5510	3.0	0.4	3.4	11.0	7.6	Complied
Middle	5590	2.1	0.4	2.5	11.0	8.5	Complied
Top	5670	2.0	0.4	2.4	11.0	8.6	Complied



Bottom Channel



Middle Channel

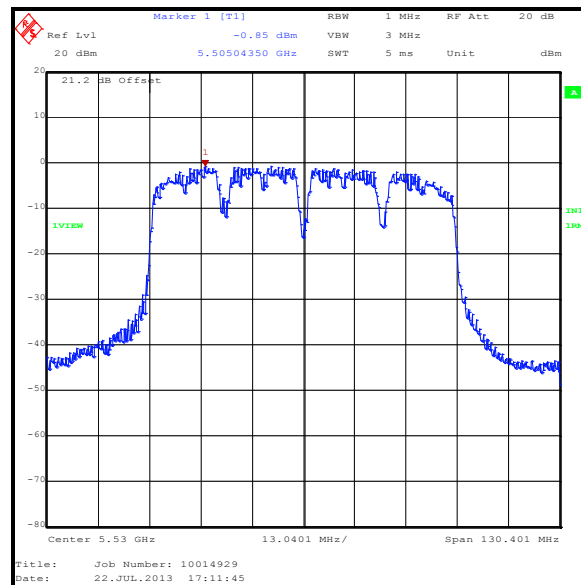


Top Channel

Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands)
(continued)

Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / 5.47-5.725 GHz band

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Single	5530	-0.9	0.6	-0.3	11.0	11.3	Complied



Single Channel

Transmitter Peak Power Spectral Density (5.725-5.85 GHz band)**Test Summary:**

Test Engineer:	Nick Steele	Test Dates:	22 July 2013 & 23 July 2013
Test Sample IMEI:	004402451246254		

FCC Reference:	Part 15.407(a)(3)
Test Method Used:	As detailed in FCC KDB 789033 F) referencing KDB 789033 E)2)e)

Environmental Conditions:

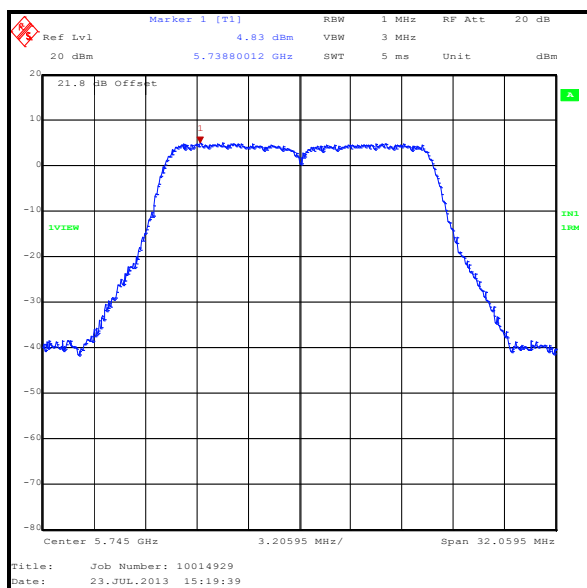
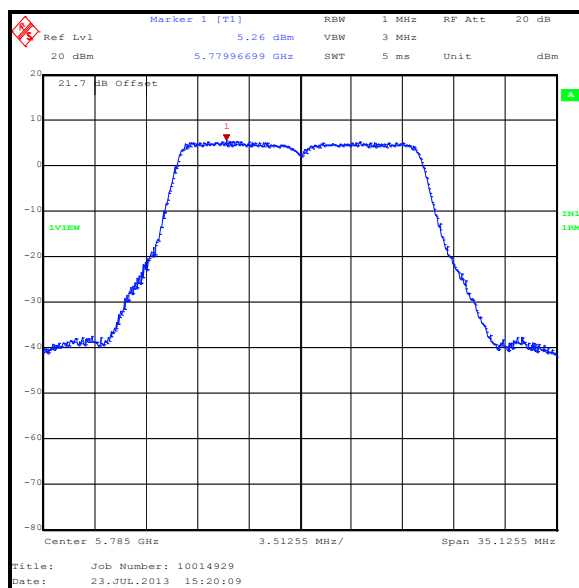
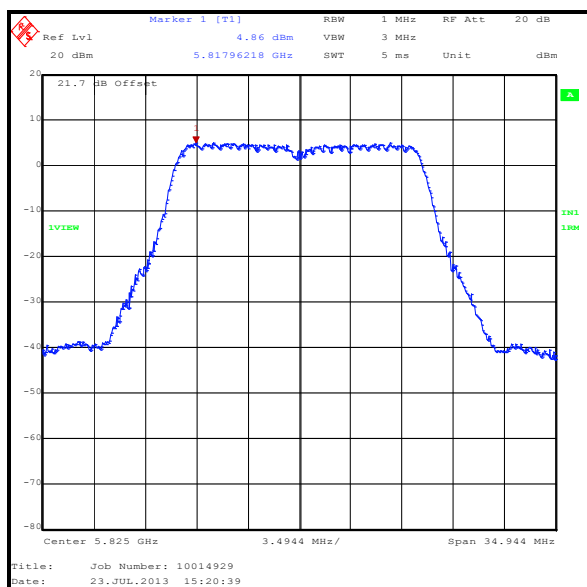
Temperature (°C):	24
Relative Humidity (%):	41

Note(s):

1. FCC Part 15.407(a)(3) limit for PPSD in the 5.725-5.85 GHz operating band is <17 dBm/MHz.

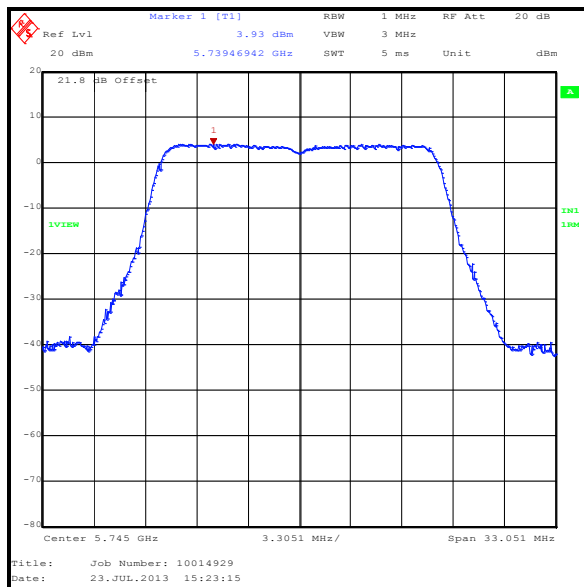
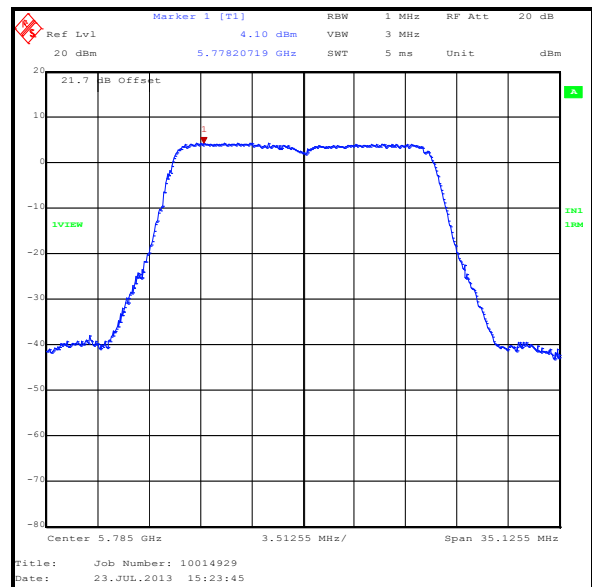
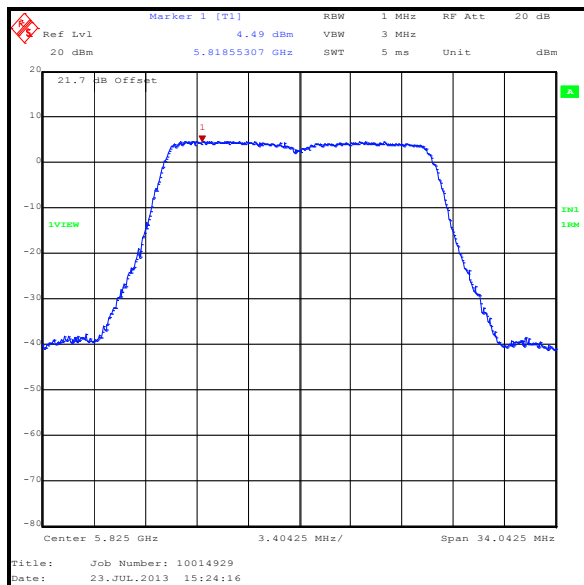
Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11a / 20 MHz / 64QAM / 54 Mbps**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5745	4.8	17.0	12.2	Complied
Middle	5785	5.3	17.0	11.7	Complied
Top	5825	4.9	17.0	12.1	Complied

**Bottom Channel****Middle Channel****Top Channel**

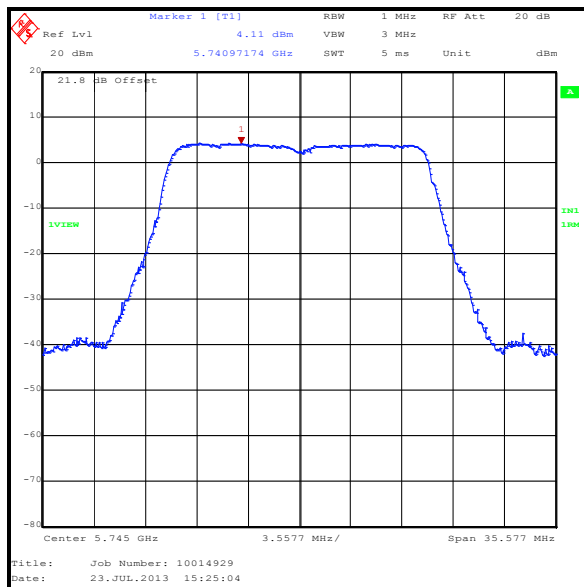
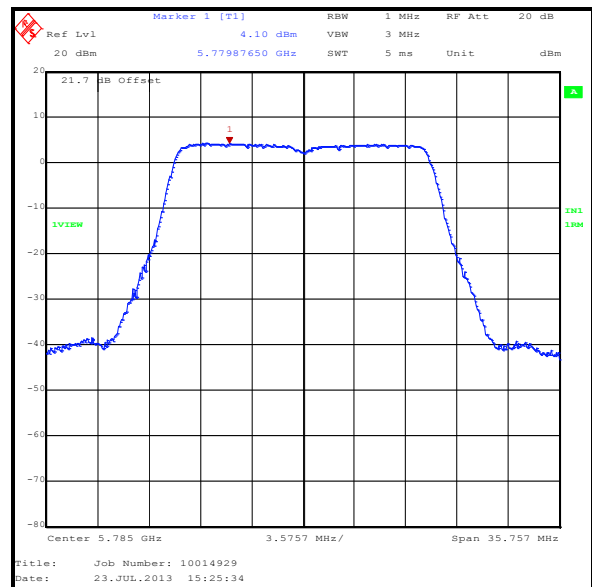
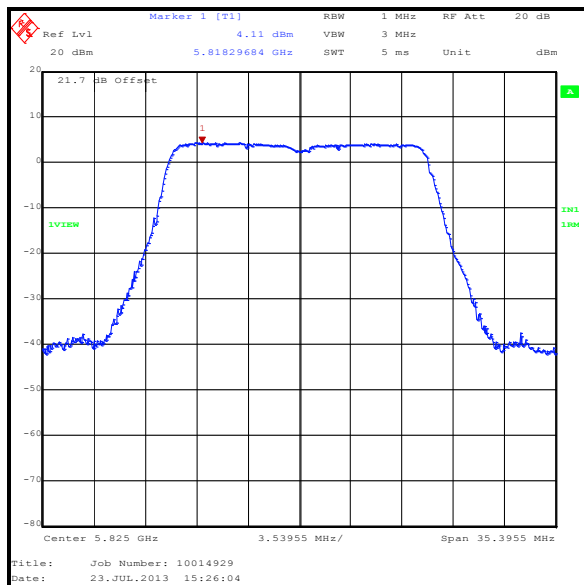
Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11n / 20 MHz / 16QAM / 28.9 Mbps / MCS3**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5745	3.9	17.0	13.1	Complied
Middle	5785	4.1	17.0	12.9	Complied
Top	5825	4.5	17.0	12.5	Complied

**Bottom Channel****Middle Channel****Top Channel**

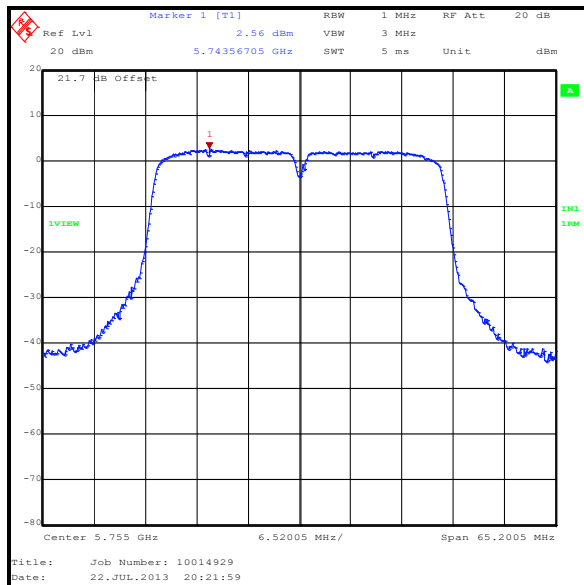
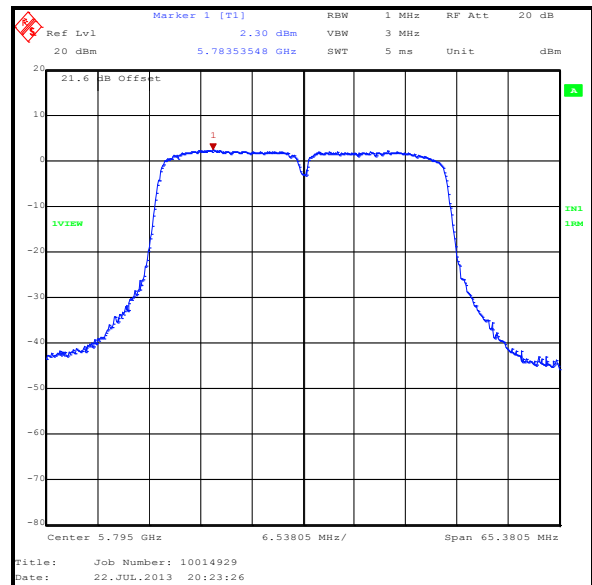
Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5745	4.1	17.0	12.9	Complied
Middle	5785	4.1	17.0	12.9	Complied
Top	5825	4.1	17.0	12.9	Complied

**Bottom Channel****Middle Channel****Top Channel**

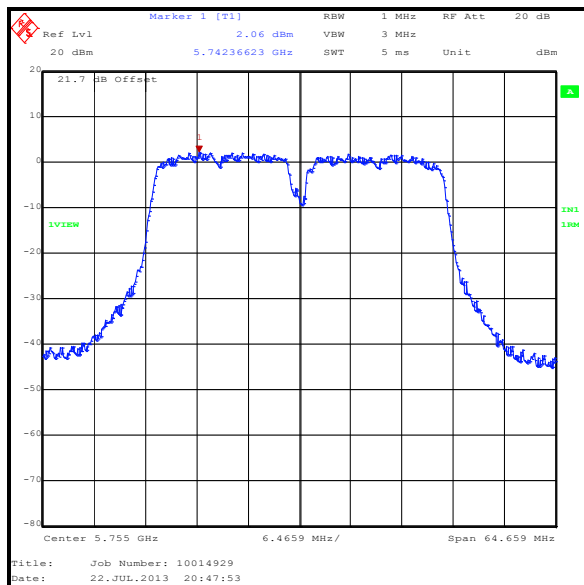
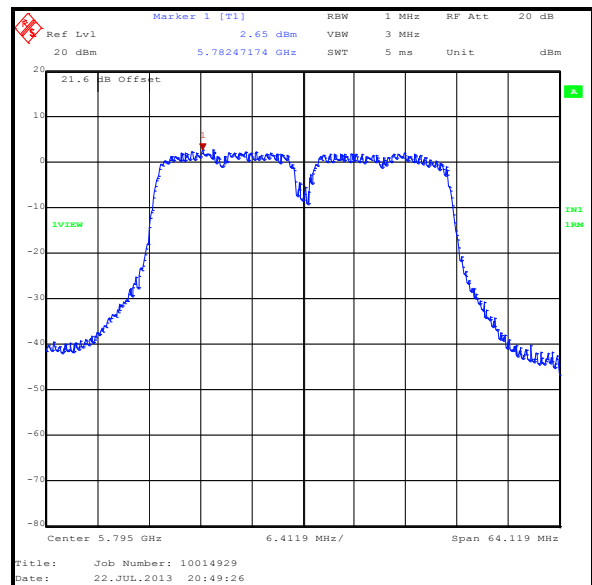
Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5755	2.6	17.0	14.4	Complied
Top	5795	2.3	17.0	14.7	Complied

**Bottom Channel****Top Channel**

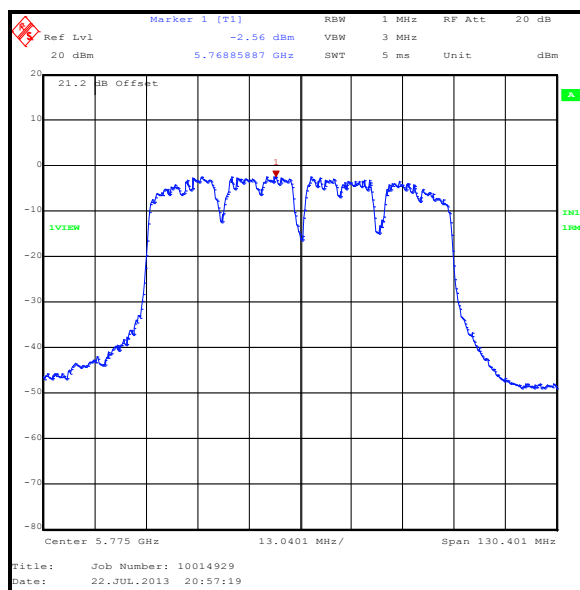
Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11ac / 40 MHz / / 64QAM / 120 Mbps / MCS5**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5755	2.1	0.4	2.5	17.0	14.5	Complied
Top	5795	2.7	0.4	3.1	17.0	13.9	Complied

**Bottom Channel****Top Channel**

Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (continued)**Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7**

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Single	5775	-2.6	0.6	-2.0	17.0	19.0	Complied

**Single Channel****Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	12
A1999	Attenuator	Huber + Suhner	6820.17.B	07101	05 Apr 2014	12
S0520	DC Power Supply	GW instek	GPC-3030	E835141	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	30 Jul 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	15 Oct 2013	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	15 May 2014	12
M1267	Thermal Power Sensor	Rohde & Schwarz	NRV-Z52	100155	14 May 2014	12
M1021	Signal Generator	Rohde & Schwarz	SMP-02	833286/004	05 Feb 2014	12

5.2.6. Transmitter Peak Excursion**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	24 July 2013
Test Sample IMEI:	004402451246254		

FCC Reference:	Part 15.407(a)(6)
Test Method Used:	As detailed in FCC KDB 789033 G)

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	48

Note(s):

1. In accordance with FCC KDB 789033 Section G)1)b), the following modes will be tested to cover all modulation types and bandwidth modes:

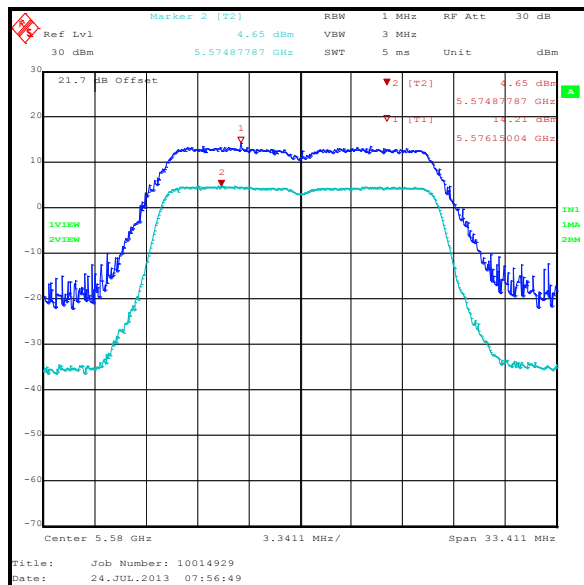
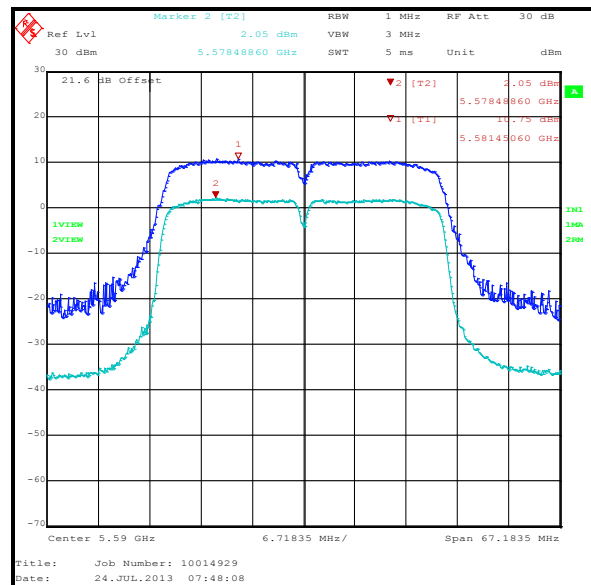
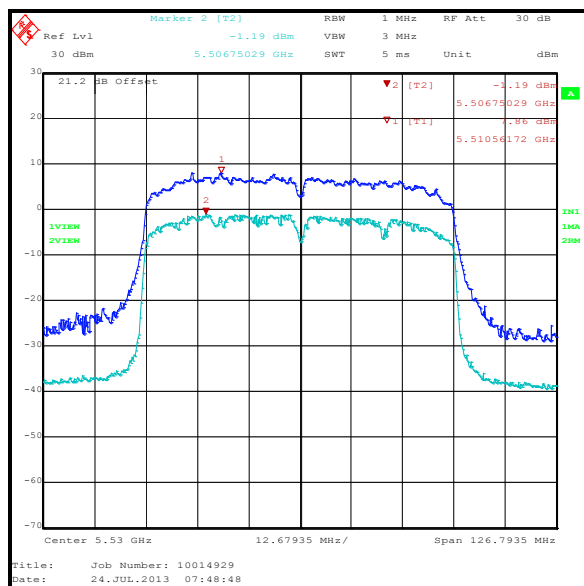
- BPSK:
 - 802.11n HT20 / 6.5 Mbps / MCS0
 - 802.11n HT40 / 13.5 Mbps / MCS0
 - 802.11ac VHT80 / 29.3 Mbps / MCS0
- QPSK:
 - 802.11n HT20 / 19.5 Mbps / MCS2
 - 802.11n HT40 / 40.5 Mbps / MCS2
 - 802.11ac VHT80 / 87.8 Mbps / MCS2
- 16QAM:
 - 802.11n HT20 / 39 Mbps / MCS4
 - 802.11n HT40 / 81 Mbps / MCS4
 - 802.11ac VHT80 / 175.5 Mbps / MCS4
- 64QAM:
 - 802.11n HT20 / 65 Mbps / MCS7
 - 802.11n HT40 / 135 Mbps / MCS7
 - 802.11ac VHT80 / 292.5 Mbps / MCS7
- 256QAM:
 - 802.11ac VHT20 / 78 Mbps / MCS8
 - 802.11ac VHT40 / 180 Mbps / MCS9
 - 802.11ac VHT80 / 390 Mbps / MCS9

Measurements were performed in these modes on middle channels of the 5470 MHz to 5725 MHz band.

2. The peak measurement (first trace) was performed in accordance with FCC KDB 789033 G)3) using a peak detector. The second measurement (trace 2) was performed in accordance with FCC KDB 789033 F) and FCC KDB 789033 E)2)e) Method SA-2 Alternative using an RMS detector. A marker was placed at the peak of the first trace. A delta marker was placed of at the peak of the second trace. For data rates that the EUT had a duty cycle <98%, the correction factor has been taken into account in order to calculate the final results. The peak excursion is the delta between the two markers and the addition of the duty cycle correction factor calculated in Section 5.2.3.

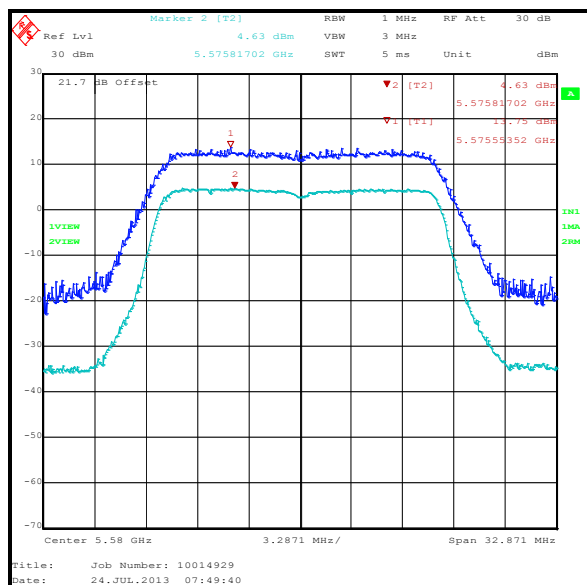
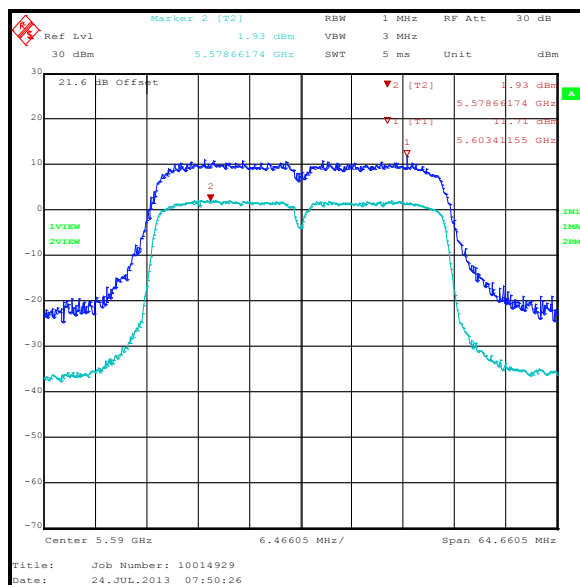
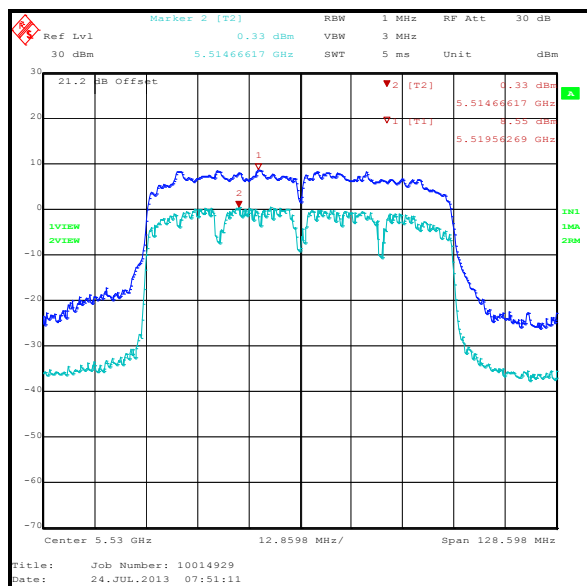
Transmitter Peak Excursion (continued)**Results: BPSK**

Middle Frequency (MHz)	Channel Bandwidth (MHz)	Peak Excursion (dB)	Duty cycle correction (dB)	Corrected Peak Excursion (dB)	Limit (dB)	Margin (dB)	Result
5580	20	9.5	N/A	N/A	13.0	3.5	Complied
5590	40	8.7	N/A	N/A	13.0	4.3	Complied
5530	80	9.1	0.2	8.9	13.0	4.1	Complied

**20 MHz / MCS0****40 MHz / MCS0****80 MHz / MCS0**

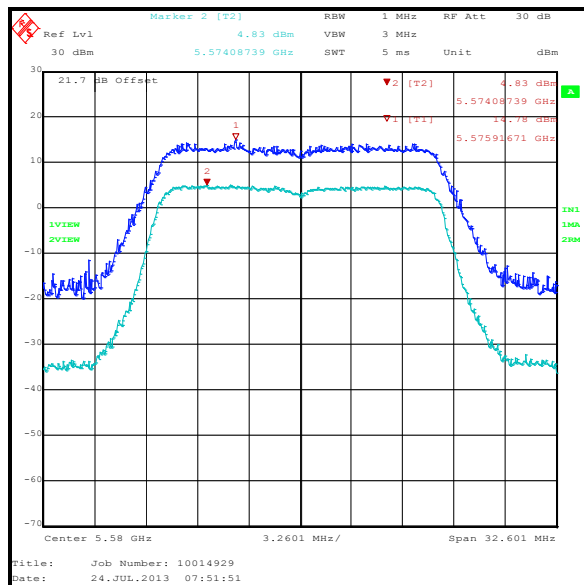
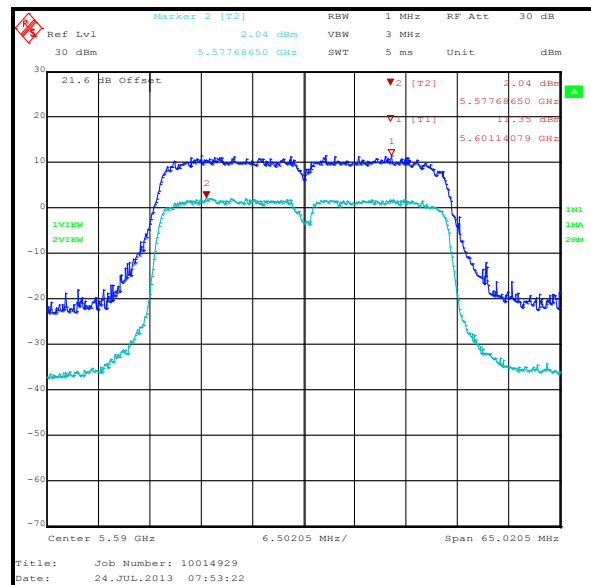
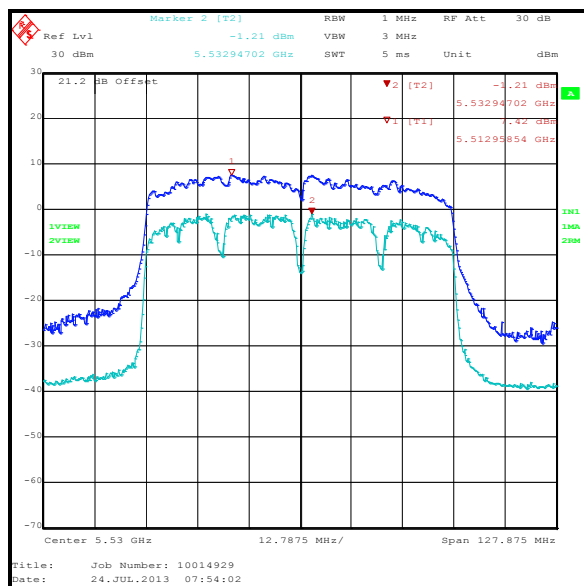
Transmitter Peak Excursion (continued)**Results: QPSK**

Middle Frequency (MHz)	Channel Bandwidth (MHz)	Peak Excursion (dB)	Duty cycle correction (dB)	Corrected Peak Excursion (dB)	Limit (dB)	Margin (dB)	Result
5580	20	9.2	N/A	N/A	13.0	3.8	Complied
5590	40	9.8	N/A	N/A	13.0	3.2	Complied
5530	80	8.2	0.4	7.8	13.0	5.2	Complied

**20 MHz / MCS2****40 MHz / MCS2****80 MHz / MCS2**

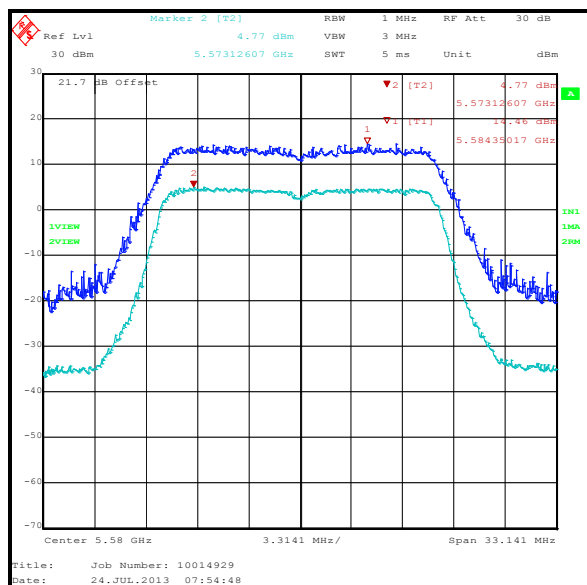
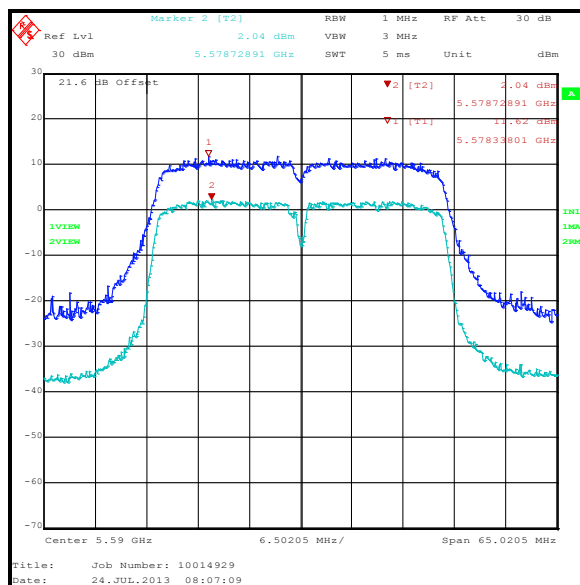
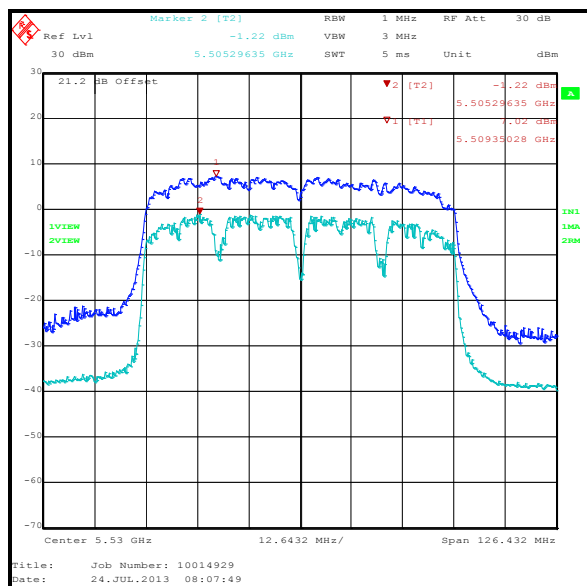
Transmitter Peak Excursion (continued)**Results: 16QAM**

Middle Frequency (MHz)	Channel Bandwidth (MHz)	Peak Excursion (dB)	Duty cycle correction (dB)	Corrected Peak Excursion (dB)	Limit (dB)	Margin (dB)	Result
5580	20	10.0	N/A	N/A	13.0	3.0	Complied
5590	40	9.4	N/A	N/A	13.0	3.6	Complied
5530	80	8.6	0.5	8.1	13.0	4.9	Complied

**20 MHz / MCS4****40 MHz / MCS4****80 MHz / MCS4**

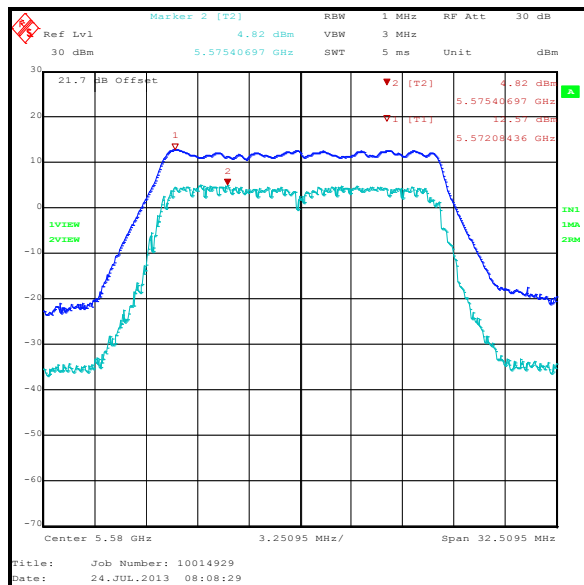
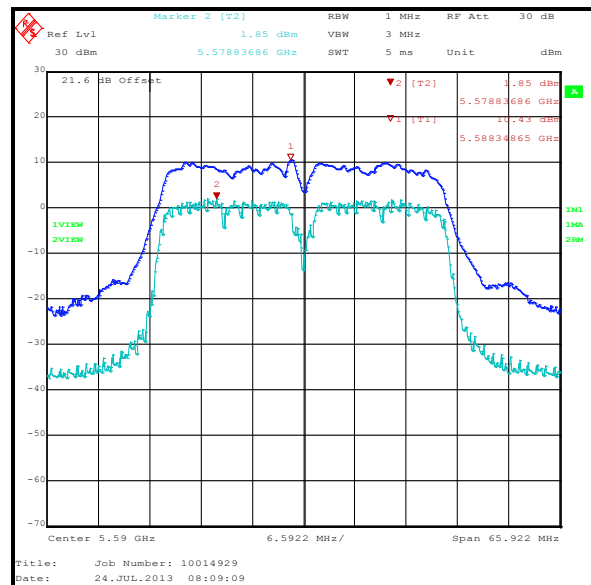
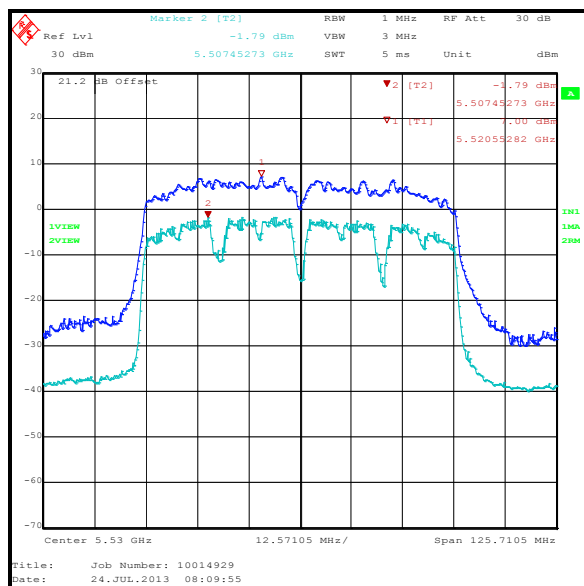
Transmitter Peak Excursion (continued)**Results: 64QAM**

Middle Frequency (MHz)	Channel Bandwidth (MHz)	Peak Excursion (dB)	Duty cycle correction (dB)	Corrected Peak Excursion (dB)	Limit (dB)	Margin (dB)	Result
5580	20	9.7	N/A	N/A	13.0	3.3	Complied
5590	40	9.6	0.2	9.4	13.0	3.6	Complied
5530	80	8.2	0.6	7.6	13.0	5.4	Complied

**20 MHz / MCS7****40 MHz / MCS7****80 MHz / MCS7**

Transmitter Peak Excursion (continued)**Results: 256QAM**

Middle Frequency (MHz)	Channel Bandwidth (MHz)	Peak Excursion (dB)	Duty cycle correction (dB)	Corrected Peak Excursion (dB)	Limit (dB)	Margin (dB)	Result
5580	20	7.8	0.3	7.5	13.0	5.5	Complied
5590	40	8.5	0.5	8.0	13.0	5.0	Complied
5530	80	8.8	0.7	8.1	13.0	4.9	Complied

**20 MHz / MCS8****40 MHz / MCS9****80 MHz / MCS9**

Transmitter Peak Excursion (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1659	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	12
A1999	Attenuator	Huber + Suhner	6820.17.B	07101	05 Apr 2014	12
S0520	DC Power Supply	GW instek	GPC-3030	E835141	Calibrated before use	-
M1269	Multimeter	Fluke	179	90250210	30 Jul 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	15 Oct 2013	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	15 May 2014	12
M1267	Thermal Power Sensor	Rohde & Schwarz	NRV-Z52	100155	14 May 2014	12
M1021	Signal Generator	Rohde & Schwarz	SMP-02	833286/004	05 Feb 2014	12

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

Test Engineer:	Andrew Edwards	Test Date:	25 July 2013
Test Sample IMEI:	004402451250389		

FCC Reference:	Parts 15.407(b)(3),(6),(7) & 15.209(a)
Test Method Used:	FCC KDB 789033 H) & ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

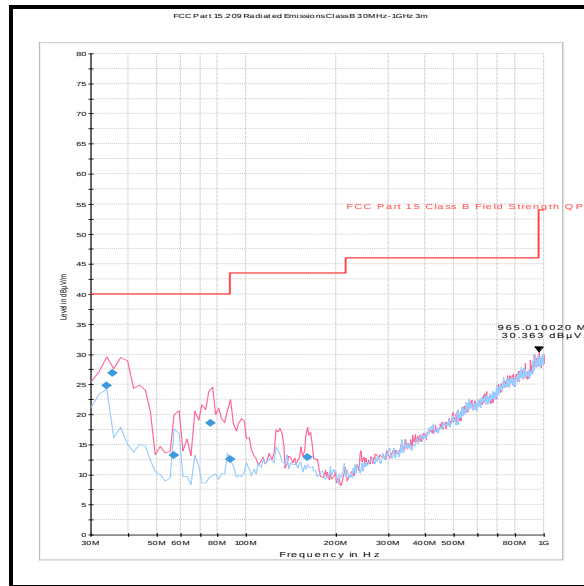
Temperature (°C):	24
Relative Humidity (%):	43

Note(s):

1. Measurements below 1 GHz were limited to the 5.47-5.725 GHz band, the EUT was transmitting with a data rate of 12 Mbps (802.11a). 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.
2. Pre-scans with the EUT transmitting on the top channel were measured according to FCC Part 15.407(b)(3) which states for transmitters operating in the band 5.47 to 5.725 GHz: all emissions outside of the band shall not exceed -27 dBm/MHz. Part(b)(6) states unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
4. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
5. All emissions were determined to be in restricted bands and greater than 20 dB below the applicable limit therefore the highest noise floor reading was recorded as shown in the table below.
6. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Results: Top Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
965.010	Vertical	30.4	54.0	23.6	Complied

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A490	Antenna	Chase	CBL6111A	1590	09 Apr 2014	12
A1834	Attenuator	Hewlett Packard	8491B	10444	27 Jan 2014	12
G0543	Amplifier	Sonoma	310N	230801	05 Oct 2013	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	24 Oct 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	07 Feb 2014	12
M1622	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	None stated	24 May 2014	12

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	24 July 2013
Test Sample IMEI:	004402451250389		

FCC Reference:	Part 15.407(b)(3),(7) & 15.209(a)
Test Method Used:	FCC KDB 789033 H) & ANSI C63.10 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	42

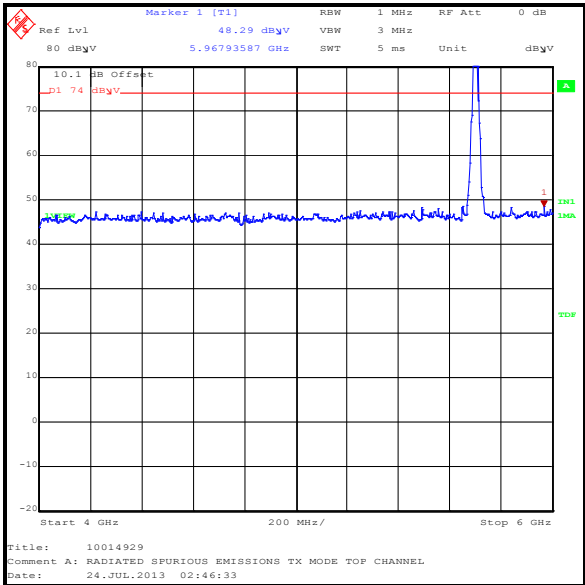
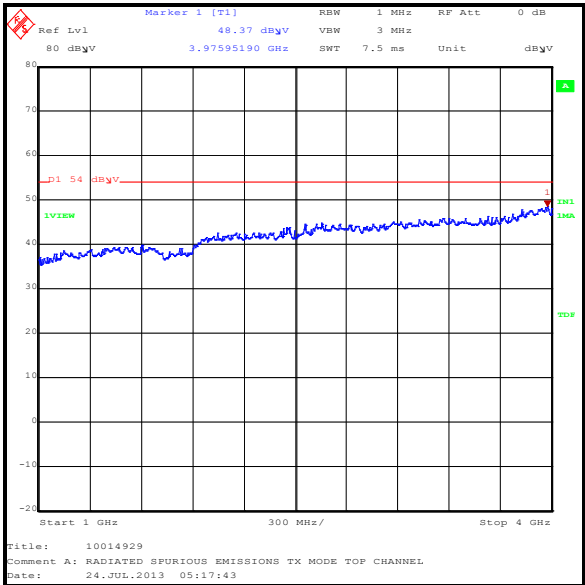
Note(s):

1. FCC Part 15.407(b)(3) states for transmitters operating in the band 5.47 to 5.725 GHz: all emissions outside of the band will not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply e.g. restricted bands of operation.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table below. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. Pre-scans were performed with the EUT transmitting on the top channel in this band. An inquiry was made to the FCC and the response was pre-scans could be performed in the band with the highest conducted output power and all final measurements should be performed on any emission seen for each band.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
5. The emission shown on the 4 GHz to 6 GHz plot is the EUT fundamental.
6. Measurements were performed across the two restricted bands closest to the bands of operation with the EUT transmitting on the top channel in the 5.47 to 5.725 GHz band. Plots are included in this section of the test report. Peak and average measurements were made. No emissions were observed above the noise floor of the measurements system.
7. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

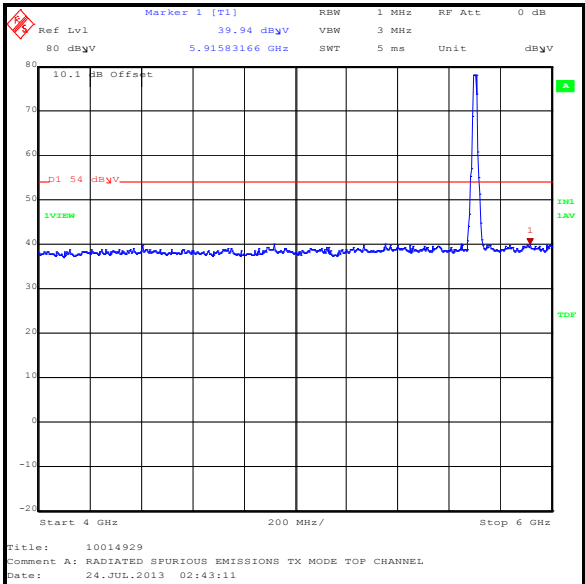
Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results:

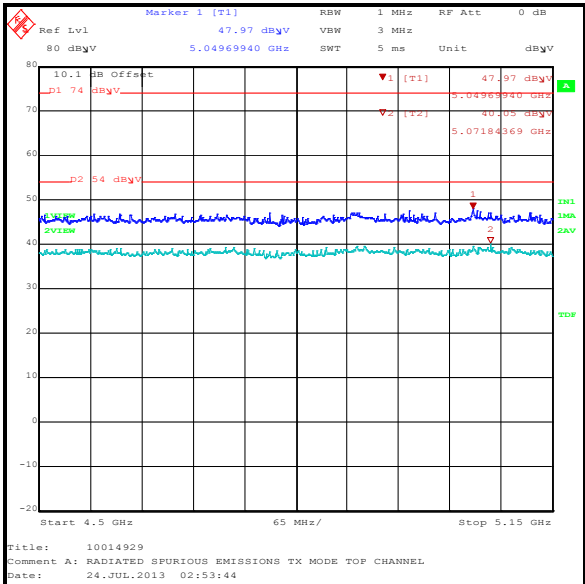
Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
39805.288	Horizontal	51.0	54.0	3.0	Complied



Peak Detector

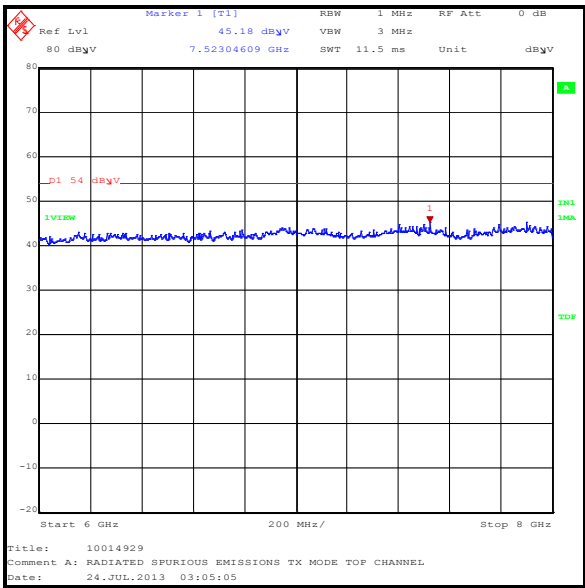
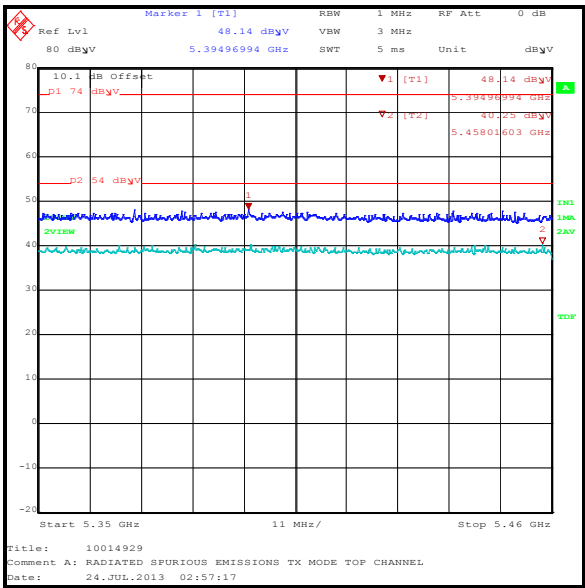


Average Detector

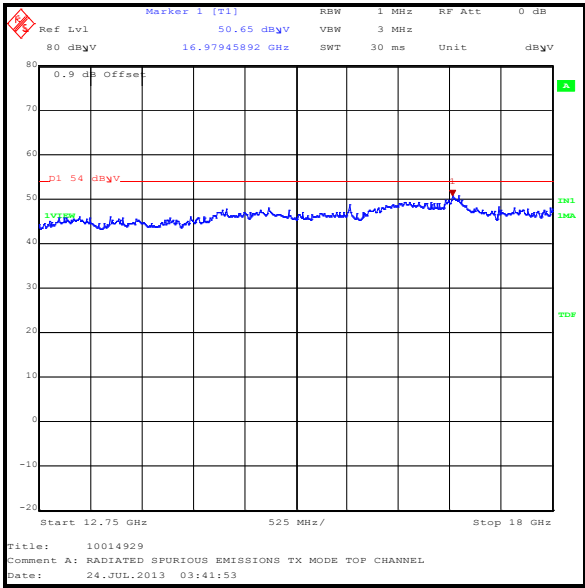
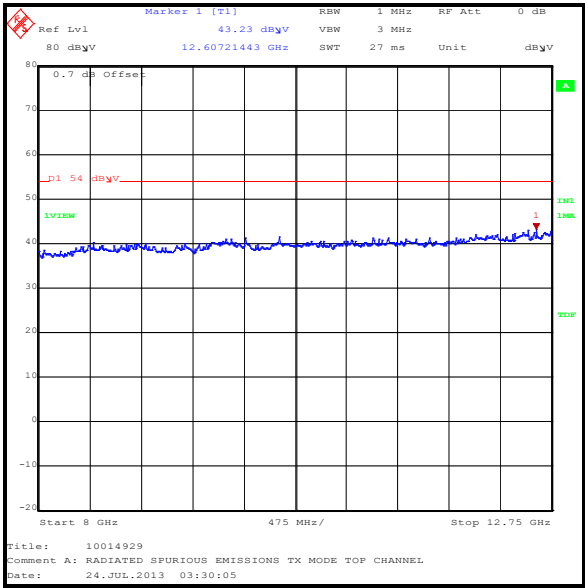


Restricted Band 4.5 GHz to 5.15 GHz

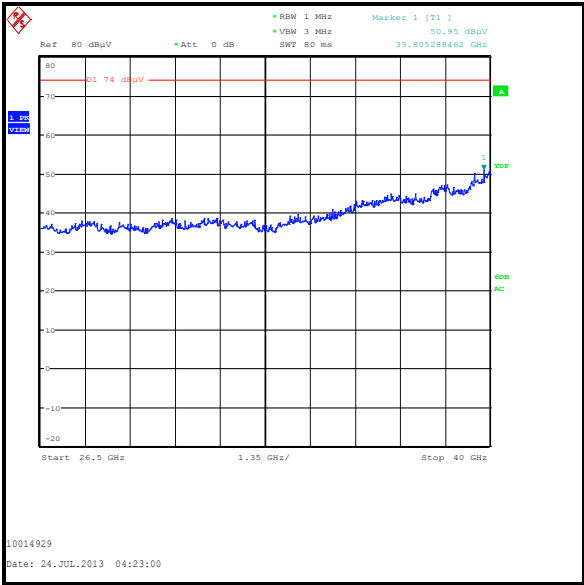
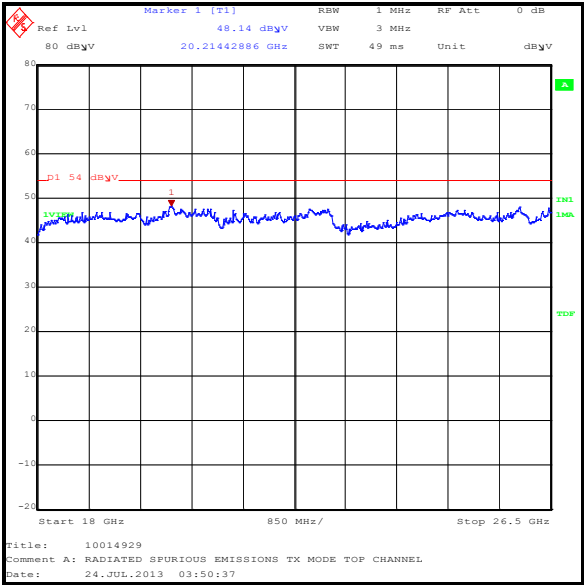
Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)



Restricted Band 5.35 GHz to 5.46 GHz



Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)



Peak Detector



Average Detector

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A203	Antenna	Flann Microwave	22240-20	343	19 May 2016	36
A253	Antenna	Flann Microwave	12240-20	128	04 Nov 2013	12
A254	Antenna	Flann Microwave	14240-20	139	04 Nov 2013	12
A255	Antenna	Flann Microwave	16240-20	519	04 Nov 2013	12
A256	Antenna	Flann Microwave	18240-20	400	04 Nov 2013	12
A436	Antenna	Flann Microwave	20240-20	330	04 Nov 2013	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
A1785	Pre Amplifier	Farran Technology	FLNA-28-30	FTL 6483	11 Jun 2013	12
A1818	Antenna	EMCO	3115	00075692	04 Nov 2013	12
A2176	High Pass Filter	Atlan TecRF	AFH-07000	800980	10 May 2014	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	14 Aug 2013	12
M1229	Digital Multimeter	Fluke	179	87640015	26 Jun 2014	12
M1630	Test Receiver	Rohde & Schwarz	ESU 40	100233	07 Feb 2014	12
M1656	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12
S0537	DC Power Supply Unit	TTI	EL302D	249928	Calibrated before use	-

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

Test Engineer:	Andrew Edwards	Test Date:	19 July 2013
Test Sample IMEI:	004402451245827		

FCC Reference:	Parts 15.407(b)(1), 15.407(b)(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.9.2 & FCC KDB 789033 H)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	38

Note(s):

1. An Inquiry was made to the FCC and the response confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
 - 802.11a - QPSK / 12 Mbps.
 - 802.11n HT20 - QPSK / 19.5 Mbps / MCS2 (GI = 800ns).
 - 802.11n HT40 - QPSK / 27 Mbps / MCS1 (GI = 800ns) & 16QAM / 60 Mbps / MCS3 (GI = 400ns).
 - 802.11ac VHT20 - BPSK / 7.2 Mbps / MCS0 (GI = 400ns) & QPSK / 14.4 Mbps / MCS1 (GI = 400ns).
 - 802.11ac VHT40 - QPSK / 30 Mbps / MCS1 (GI = 400ns) & 64QAM / 120 Mbps / MCS5 (GI = 400ns).
 - 802.11ac VHT80 – BPSK / 32.5 Mbps / MCS0 (GI = 400ns) & 64QAM / 325 Mbps / MCS7 (GI = 400ns)
2. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
3. For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
4. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz. Field strength and EIRP results were found to be compliant with the restricted band limits and Part 15.407 out-of-band limits.
5. In accordance with FCC KDB 789033 Section H)1)c), if the peak measurement is below the average limit, it is not necessary to perform a separate average measurement.
6. For average measurements, data rates where the EUT was transmitting at <98% duty cycle the correction factor calculated in section 5.2.3 was added to the measured result.
7. In accordance with FCC KDB 789033 Section H)6)c) Method AD (Vi), the average measurements were performed using an increased number of sweeps as calculated below:
 - 802.11a / 12 Mbps – 100 sweeps
 - 802.11n HT20 / 19.5 Mbps / MCS2 – 100 sweeps
 - 802.11n HT40 / 27 Mbps / MCS1 – 100 sweeps
 - 802.11n HT40 / 60 Mbps / MCS3 – 100 sweeps
 - 802.11ac VHT20 / 7.2 Mbps / MCS0 – 100 sweeps
 - 802.11ac VHT20 / 14.4 Mbps / MCS1 – 100 sweeps
 - 802.11ac VHT40 / 30 Mbps / MCS1 – 102 sweeps
 - 802.11ac VHT40 / 120 Mbps / MCS5 – 102 sweeps
 - 802.11ac VHT80 / 32.5 Mbps / MCS0 – 102 sweeps
 - 802.11ac VHT80 / 325 Mbps / MCS7 – 102 sweeps

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5148.998	63.2	74.0	10.8	Complied
5150	60.0	74.0	14.0	Complied

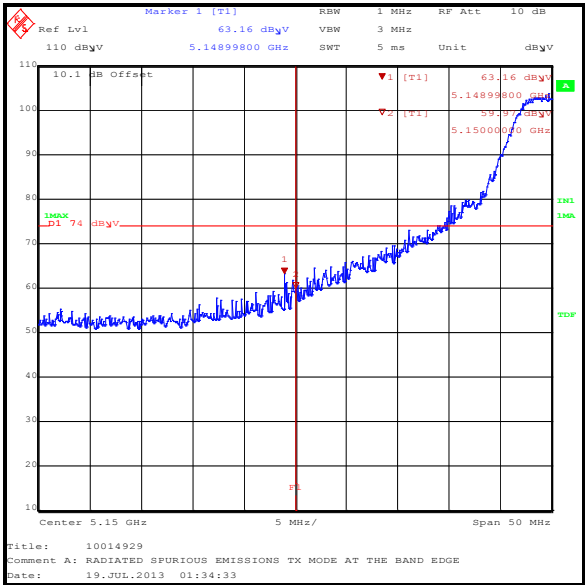
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.0	54.0	4.0	Complied
5431.814	52.2	54.0	1.8	Complied

Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Average

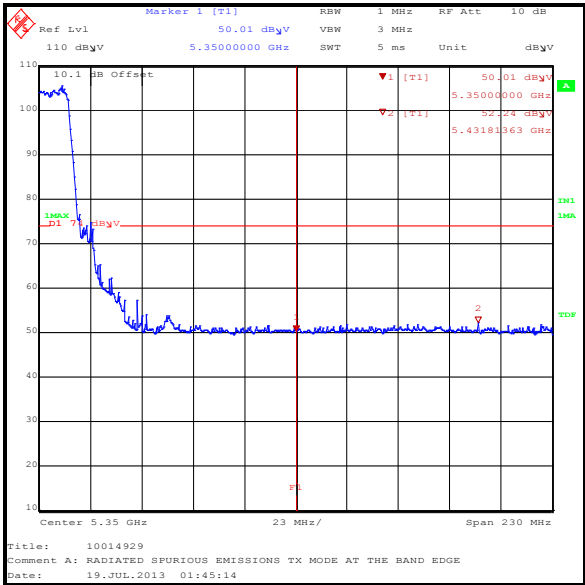
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5127.605	41.2	N/A	N/A	54.0	12.8	Complied
5150	38.1	N/A	N/A	54.0	15.9	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

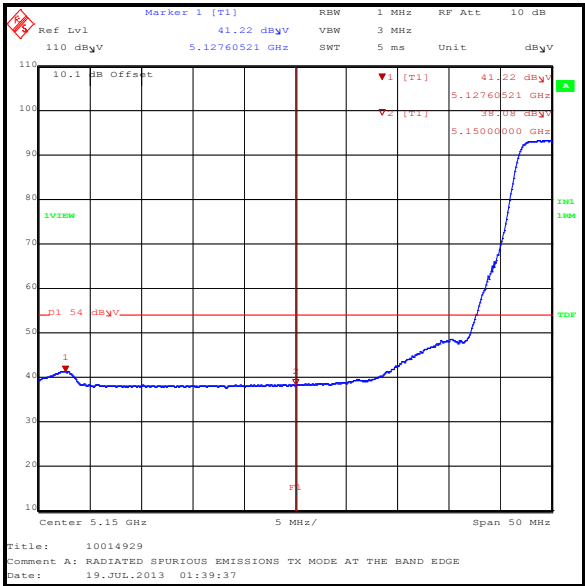
Results: 802.11a / 20 MHz / QPSK / 12 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5142.585	59.7	74.0	14.3	Complied
5150	57.4	74.0	16.6	Complied

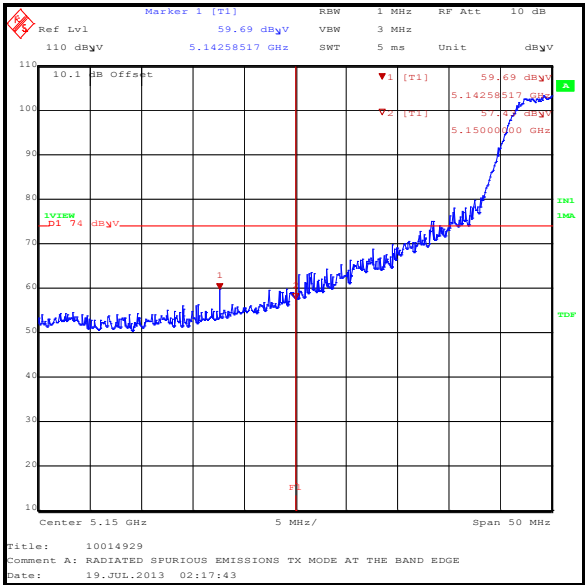
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.1	54.0	3.9	Complied
5417.525	51.8	54.0	2.2	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Average

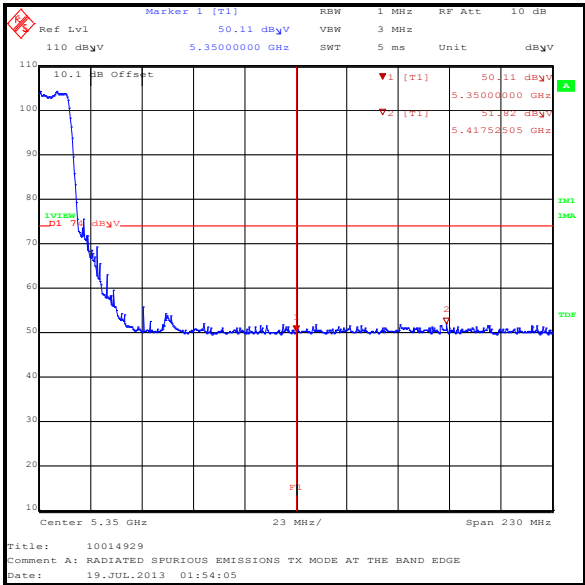
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5128.257	41.8	N/A	N/A	54.0	12.2	Complied
5150	38.3	N/A	N/A	54.0	15.7	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

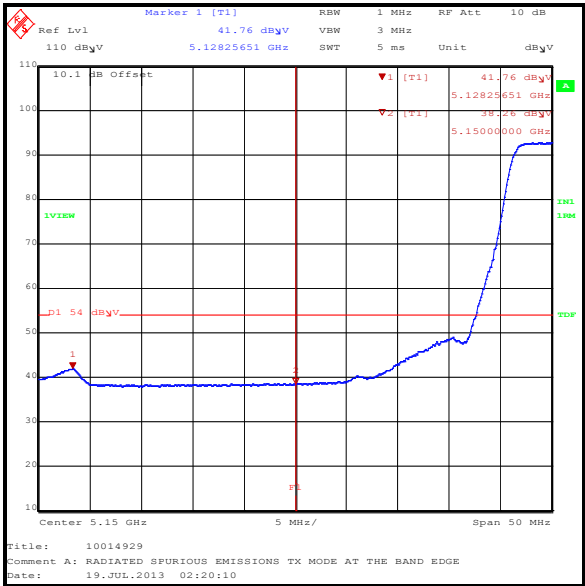
Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

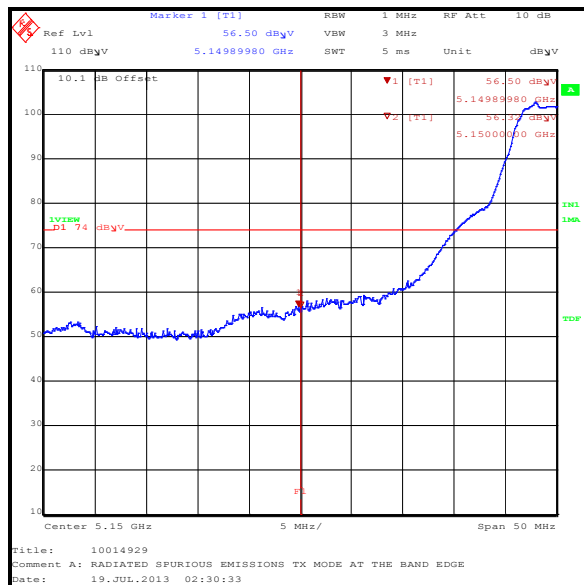
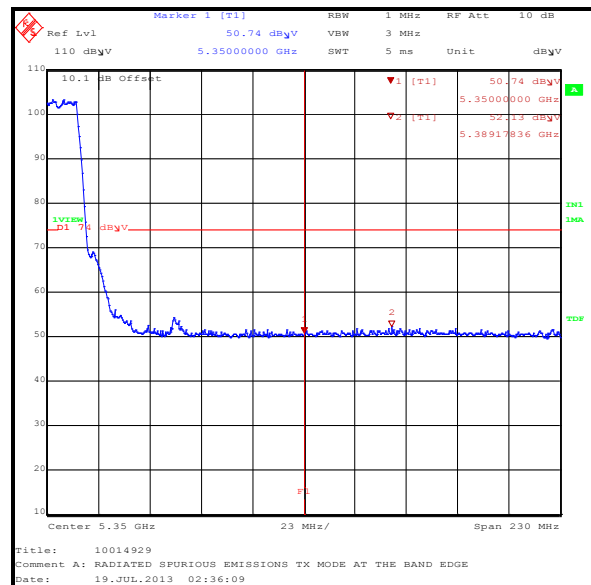
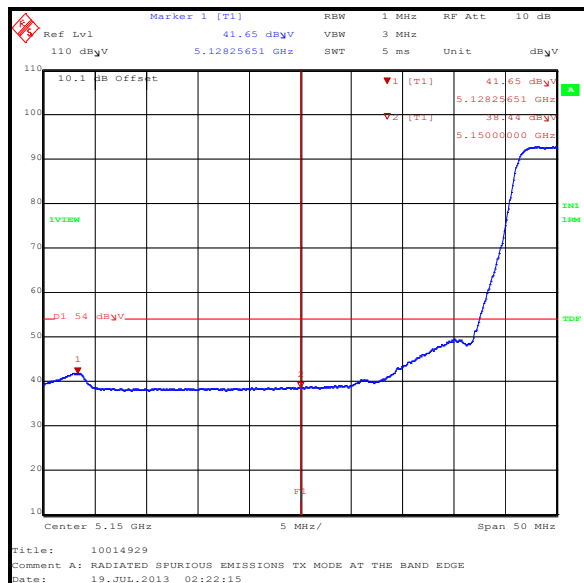
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.900	56.5	74.0	17.5	Complied
5150	56.3	74.0	17.7	Complied

Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.7	54.0	3.3	Complied
5389.178	52.1	54.0	1.9	Complied

Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Average

Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5128.257	41.7	N/A	N/A	54.0	12.3	Complied
5150	38.4	N/A	N/A	54.0	15.6	Complied

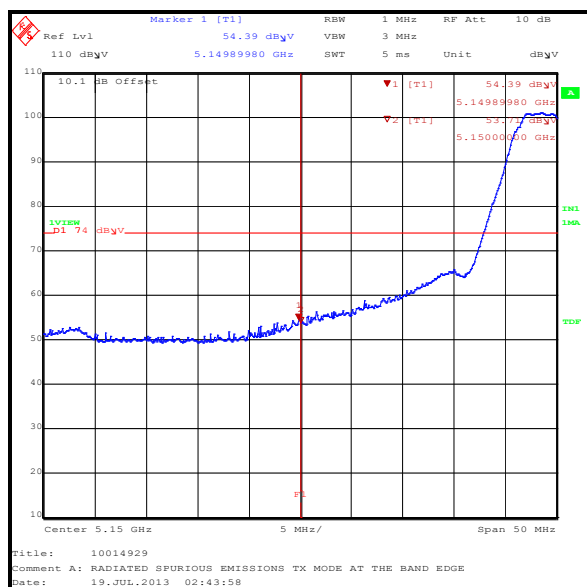
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Lower Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

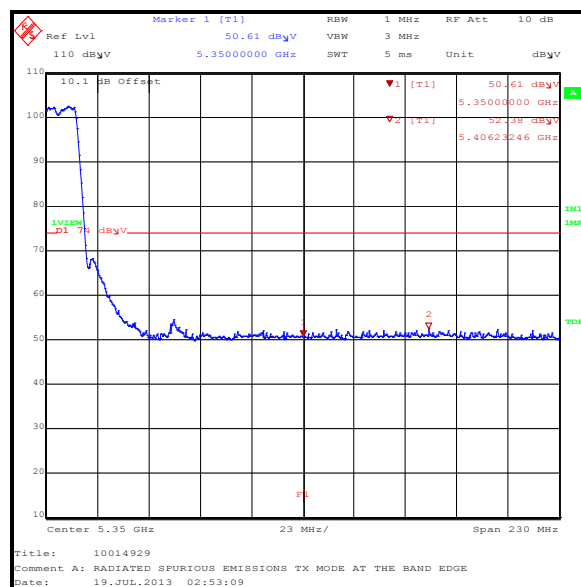
Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1 / Peak

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5149.900	54.4	74.0	19.6	Complied

Frequency (MHz)	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
5150	53.7	54.0	0.3	Complied
5350	50.6	54.0	3.4	Complied
5406.232	52.4	54.0	1.6	Complied



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.198	62.9	74.0	11.1	Complied
5150	62.3	74.0	11.7	Complied

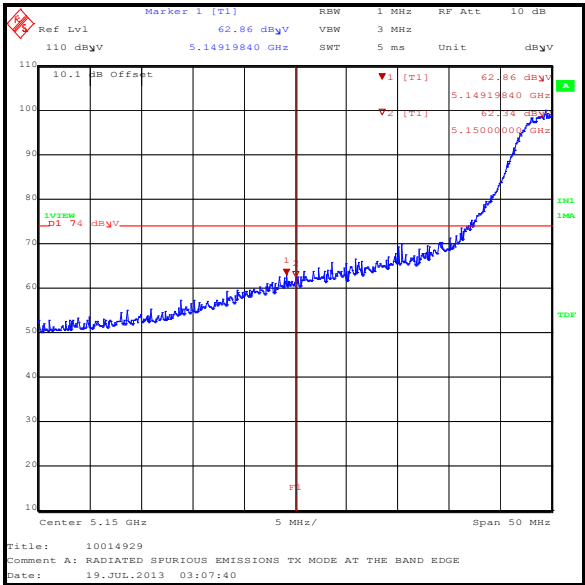
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.7	54.0	3.3	Complied
5387.796	51.9	54.0	2.1	Complied

Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Average

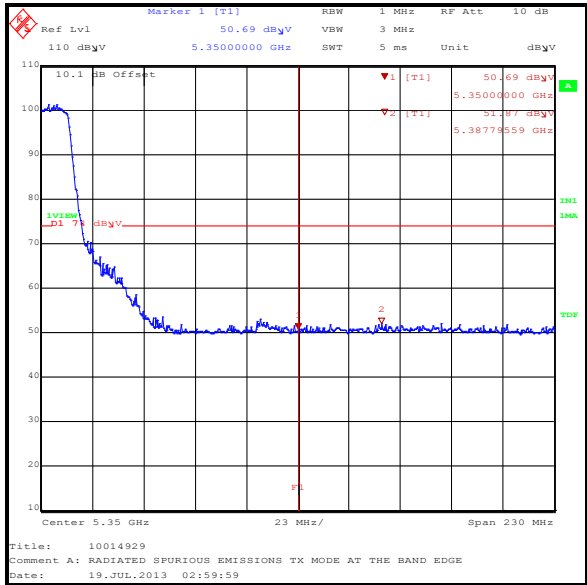
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5128.156	41.6	N/A	N/A	54.0	12.4	Complied
5150	38.6	N/A	N/A	54.0	15.4	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

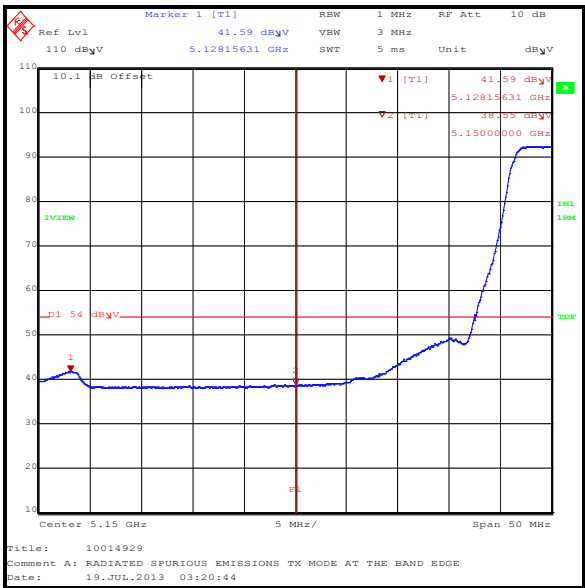
Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.399	55.0	74.0	19.0	Complied
5150	54.7	74.0	19.3	Complied

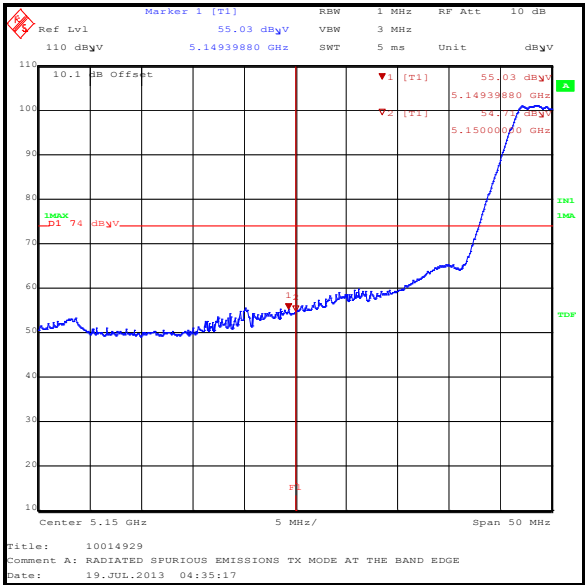
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	49.9	54.0	4.1	Complied
5354.148	51.7	54.0	2.3	Complied

Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3 / Average

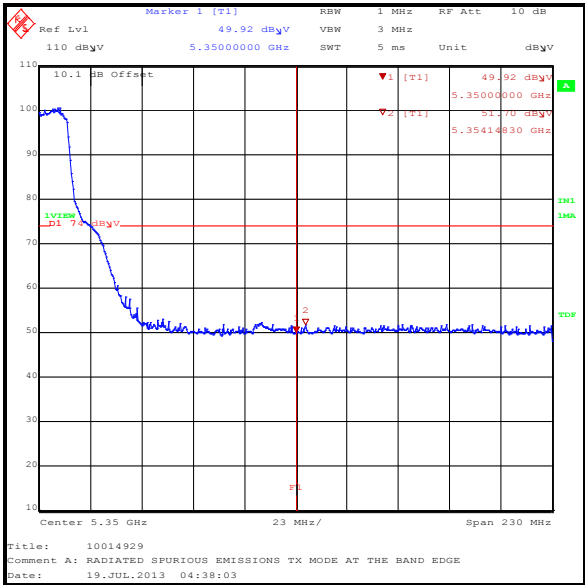
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5128.257	41.5	N/A	N/A	54.0	12.5	Complied
5150	38.6	N/A	N/A	54.0	15.4	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

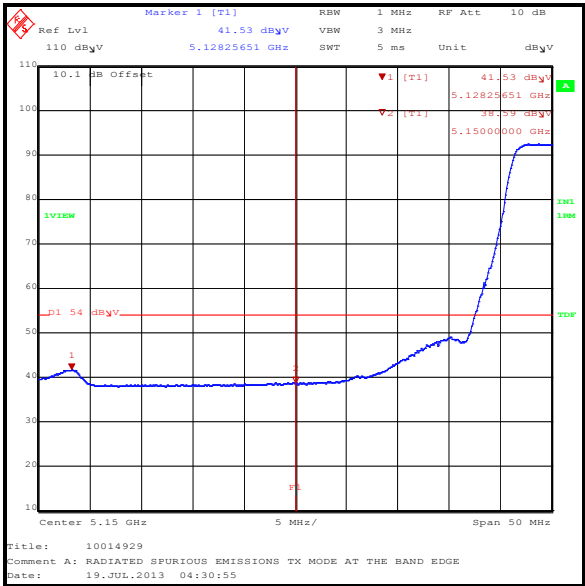
Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.599	56.8	74.0	17.2	Complied
5150	55.9	74.0	18.1	Complied

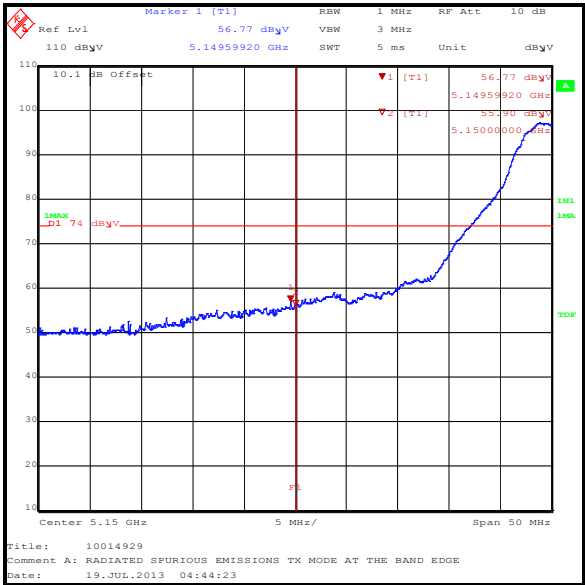
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	51.1	54.0	2.9	Complied
5390.100	52.2	54.0	1.8	Complied

Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1 / Average

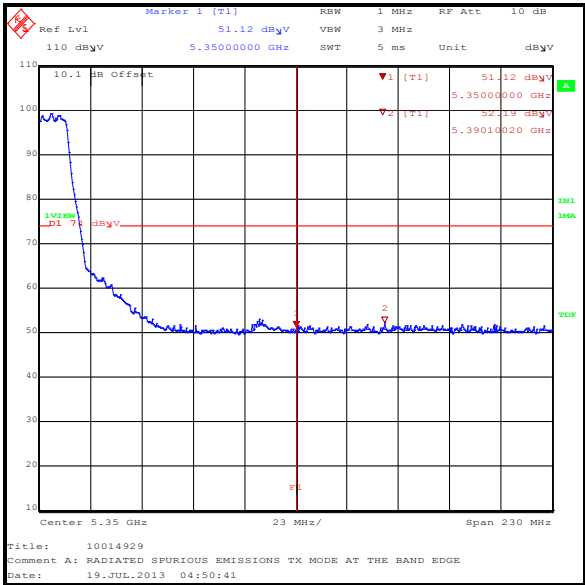
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.699	40.6	0.2	40.8	54.0	13.2	Complied
5150	40.4	0.2	40.6	54.0	13.4	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

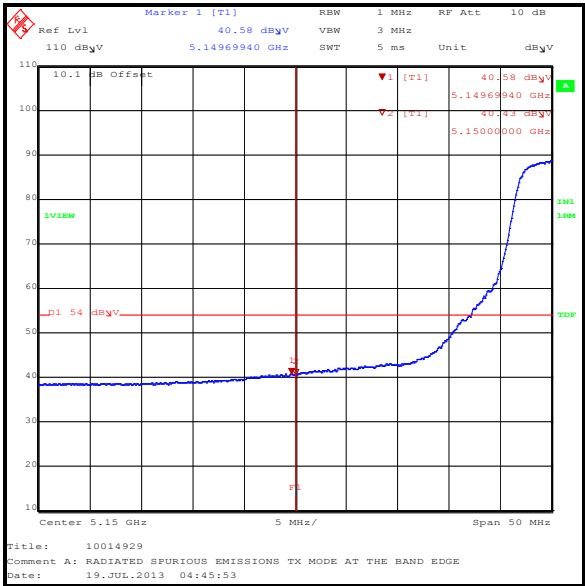
Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	54.8	74.0	19.2	Complied

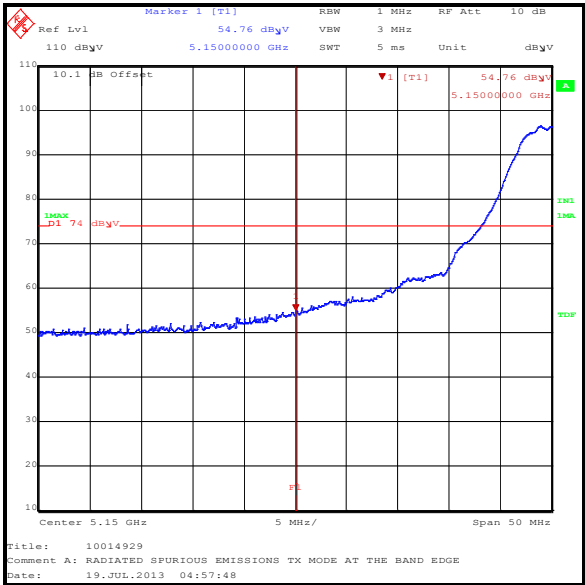
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	49.8	54.0	4.2	Complied
5380.882	52.0	54.0	2.0	Complied

Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / Average

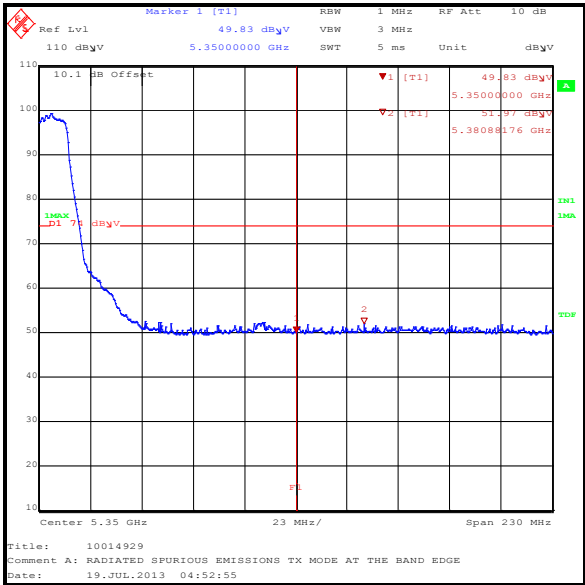
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5149.900	40.8	0.4	41.2	54.0	12.8	Complied
5150	40.7	0.4	41.1	54.0	12.9	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

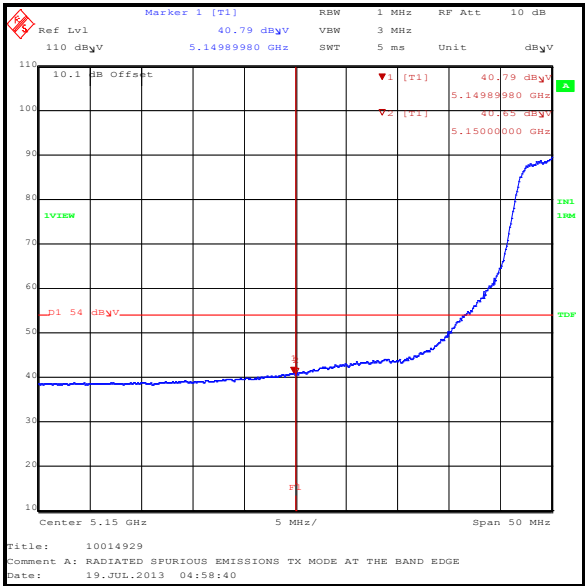
Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

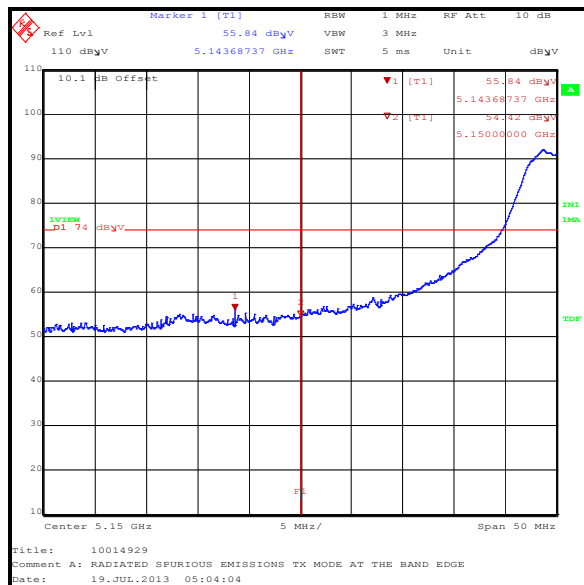
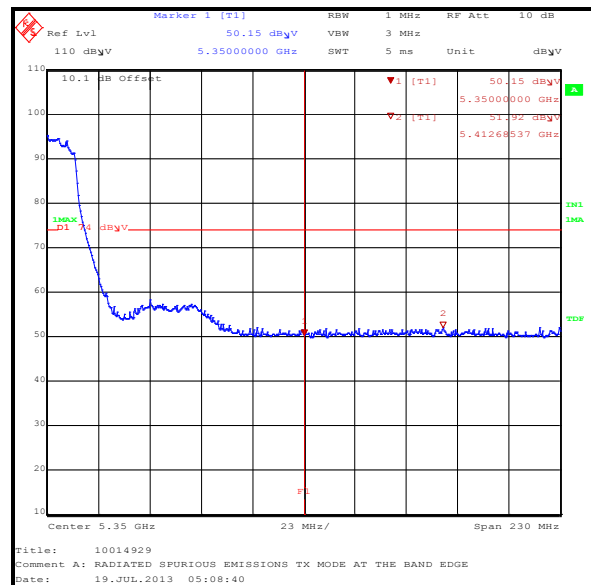
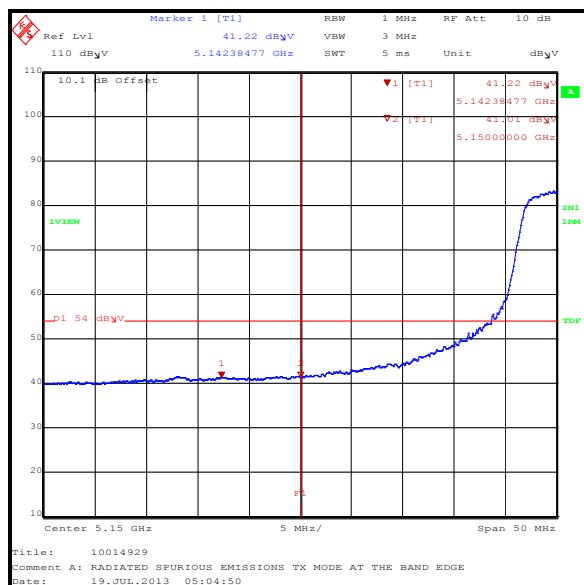
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5143.687	55.8	74.0	18.2	Complied
5150	54.4	74.0	19.6	Complied

Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.2	54.0	3.8	Complied
5412.685	51.9	54.0	2.1	Complied

Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Average

Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5142.385	41.2	0.2	41.4	54.0	12.6	Complied
5150	41.0	0.2	41.2	54.0	12.8	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0****Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement****Lower Band Edge Average Measurement**

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5148.597	56.0	74.0	18.0	Complied
5150	55.7	74.0	18.3	Complied

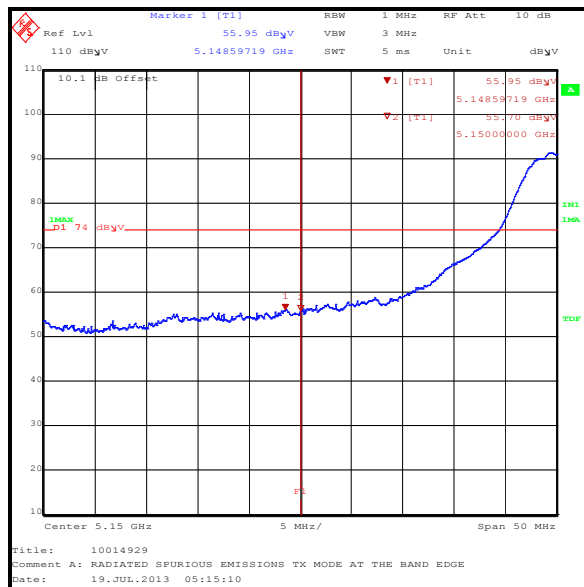
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5350	50.6	54.0	3.4	Complied
5404.850	51.8	54.0	2.2	Complied

Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Average

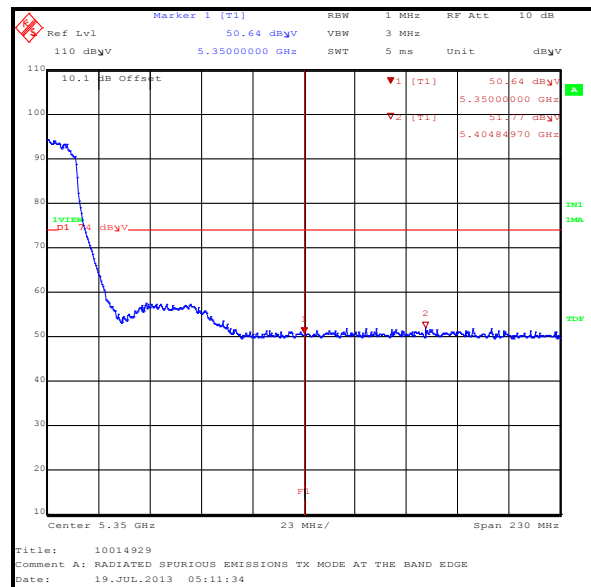
Frequency (MHz)	Level (dB μ V/m)	Duty cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5150	41.1	0.6	41.7	54.0	12.3	Complied

Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

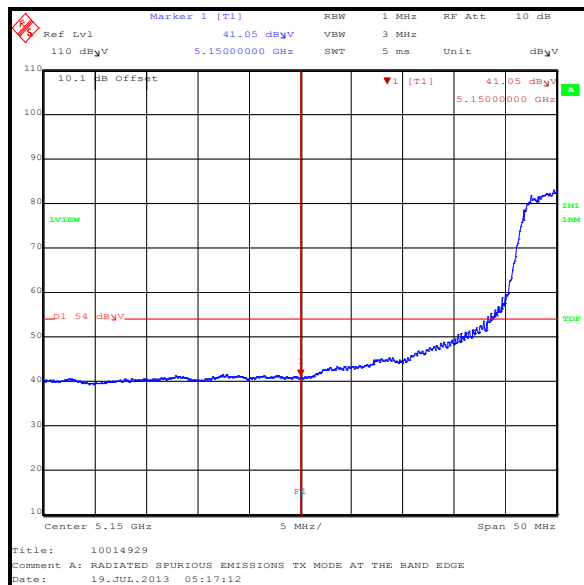
Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Lower Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	21 July 2013
Test Sample IMEI:	004402451245827		

FCC Reference:	Parts 15.407(b)(2), 15.407(b)(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.9.2 & FCC KDB 789033 H)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	45

Note(s):

1. An Inquiry was made to the FCC and the response confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
 - 802.11a – QPSK / 12 Mbps.
 - 802.11n HT20 – QPSK / 19.5 Mbps / MCS2 (GI = 800ns).
 - 802.11n HT40 – QPSK / 27 Mbps / MCS1 (GI = 800ns) & 16QAM / 60 Mbps / MCS3 (GI = 400ns).
 - 802.11ac VHT20 – BPSK / 7.2 Mbps / MCS0 (GI = 400ns) & QPSK / 14.4 Mbps / MCS1 (GI = 400ns).
 - 802.11ac VHT40 – QPSK / 30 Mbps / MCS1 (GI = 400ns) & 64QAM / 120 Mbps / MCS5 (GI = 400ns).
 - 802.11ac VHT80 – BPSK / 32.5 Mbps / MCS0 (GI = 400ns) & 64QAM / 325 Mbps / MCS7 (GI = 400ns).
2. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
3. For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
4. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz. Field strength and EIRP results were found to be compliant with the restricted band limits and Part 15.407 out-of-band limits.
5. In accordance with FCC KDB 789033 Section H)1)c), if the peak measurement is below the average limit, it is not necessary to perform a separate average measurement.
6. For average measurements, data rates where the EUT was transmitting at <98% duty cycle the correction factor calculated in section 5.2.3 was added to the measured result.
7. In accordance with FCC KDB 789033 Section H)6)c) Method AD (Vi), the average measurements were performed using an increased number of sweeps as calculated below:
 - 802.11a / 12 Mbps – 100 sweeps
 - 802.11n HT20 / 19.5 Mbps / MCS2 – 100 sweeps
 - 802.11n HT40 / 27 Mbps / MCS1 – 100 sweeps
 - 802.11n HT40 / 60 Mbps / MCS3 – 100 sweeps
 - 802.11ac VHT20 / 7.2 Mbps / MCS0 – 100 sweeps
 - 802.11ac VHT20 / 14.4 Mbps / MCS1 – 100 sweeps
 - 802.11ac VHT40 / 30 Mbps / MCS1 – 102 sweeps
 - 802.11ac VHT40 / 120 Mbps / MCS5 – 102 sweeps
 - 802.11ac VHT80 / 32.5 Mbps / MCS0 – 102 sweeps
 - 802.11ac VHT80 / 325 Mbps / MCS7 – 102 sweeps

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	56.6	74.0	17.4	Complied
5350.301	57.1	74.0	16.9	Complied

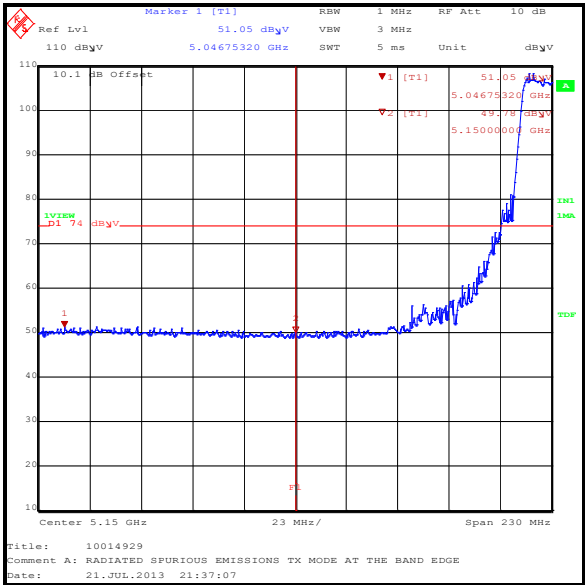
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5046.753	51.1	54.0	2.9	Complied
5150	49.8	54.0	4.2	Complied

Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Average

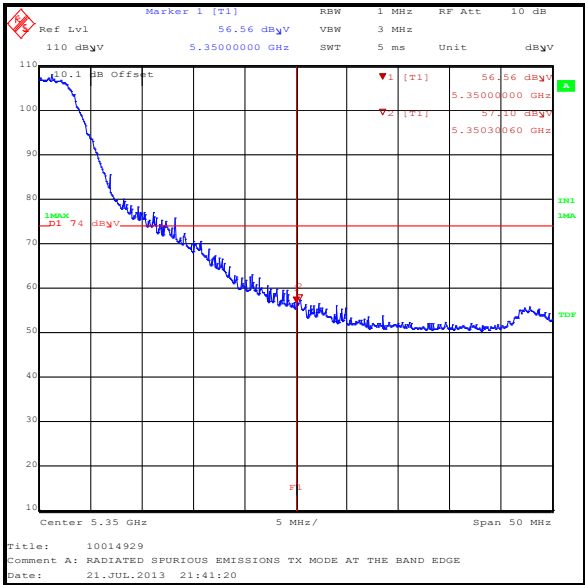
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	40.5	N/A	N/A	54.0	13.5	Complied
5372.044	44.6	N/A	N/A	54.0	9.4	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

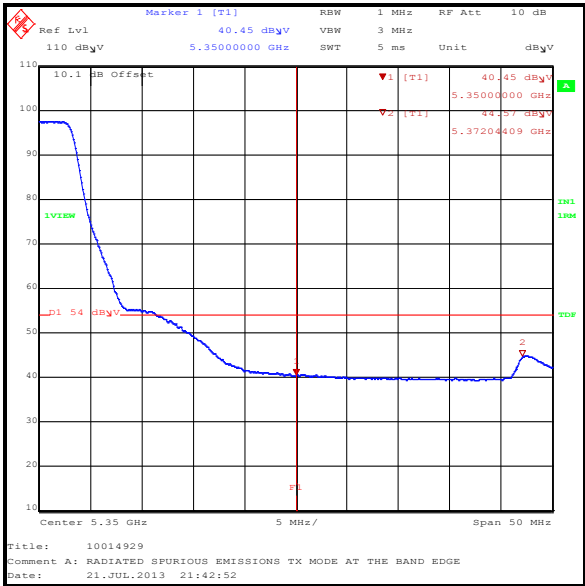
Results: 802.11a / 20 MHz / QPSK / 12 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	55.0	74.0	19.0	Complied
5350.200	57.1	74.0	16.9	Complied

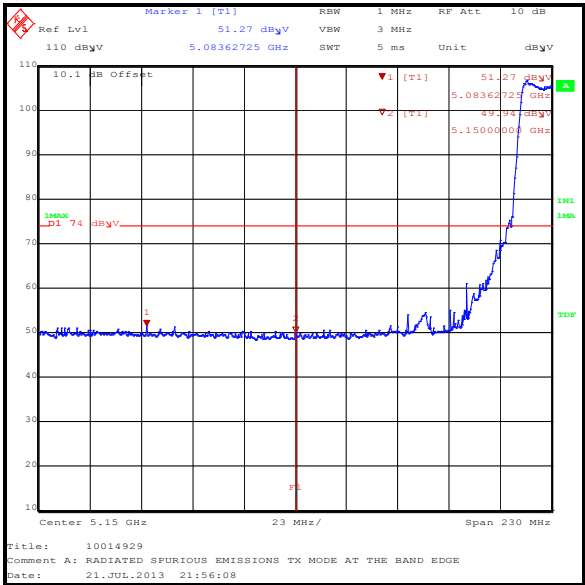
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5083.627	51.3	54.0	2.7	Complied
5150	49.9	54.0	4.1	Complied

Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Average

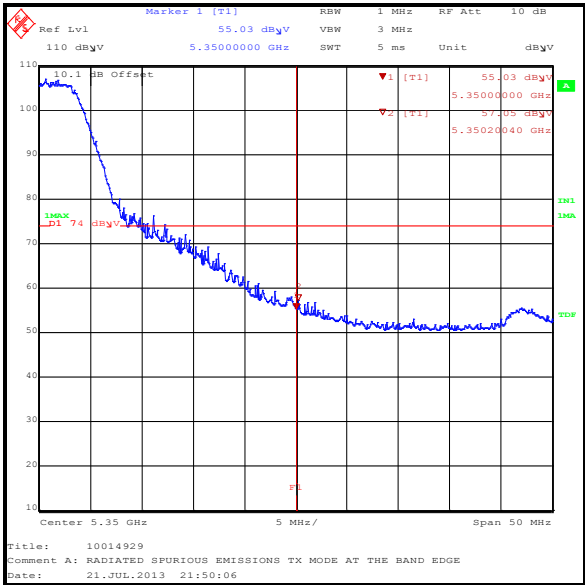
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	40.2	N/A	N/A	54.0	13.8	Complied
5371.894	44.7	N/A	N/A	54.0	9.3	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

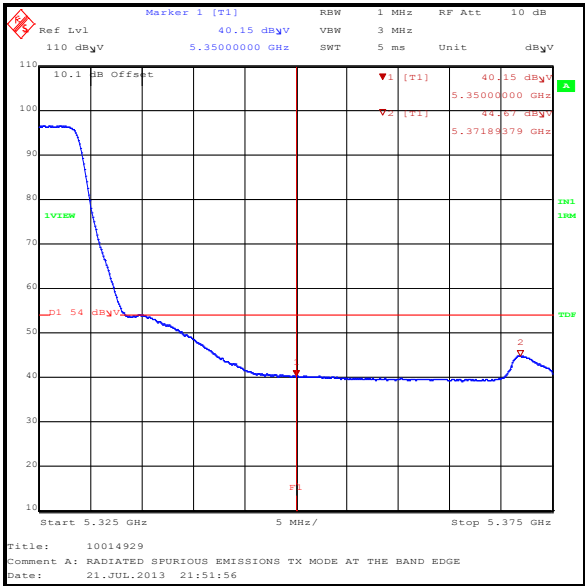
Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	54.8	74.0	19.2	Complied
5371.693	55.3	74.0	18.7	Complied

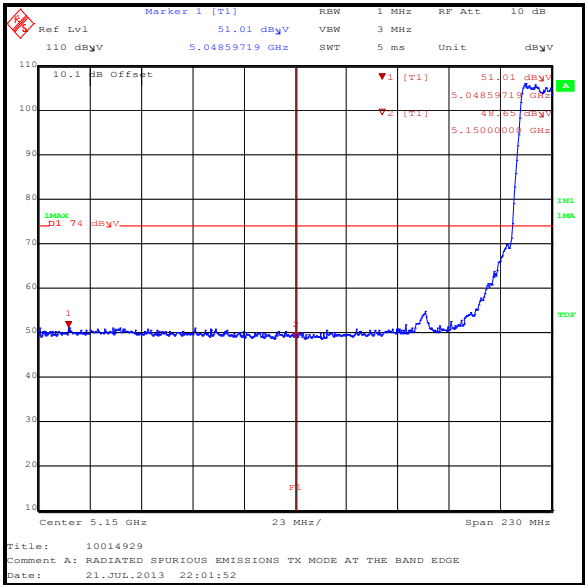
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5048.597	51.0	54.0	3.0	Complied
5150	48.7	54.0	5.3	Complied

Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Average

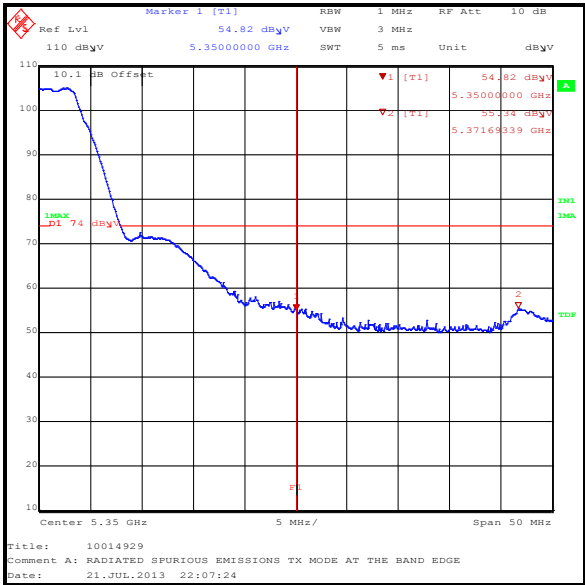
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	39.9	N/A	N/A	54.0	14.1	Complied
5371.794	44.7	N/A	N/A	54.0	9.3	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

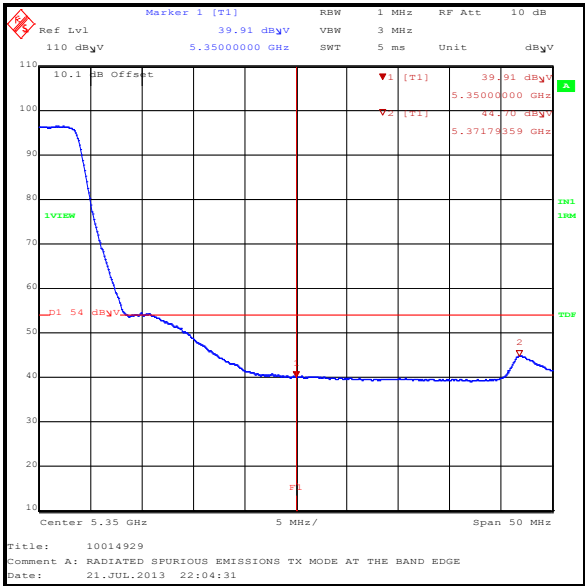
Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	54.8	74.0	19.2	Complied
5372.495	55.7	74.0	18.3	Complied

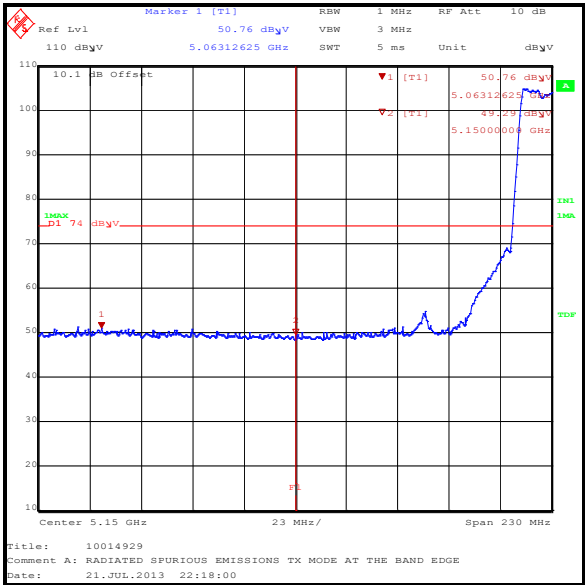
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5063.126	50.8	54.0	3.2	Complied
5150	49.3	54.0	4.7	Complied

Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1 / Average

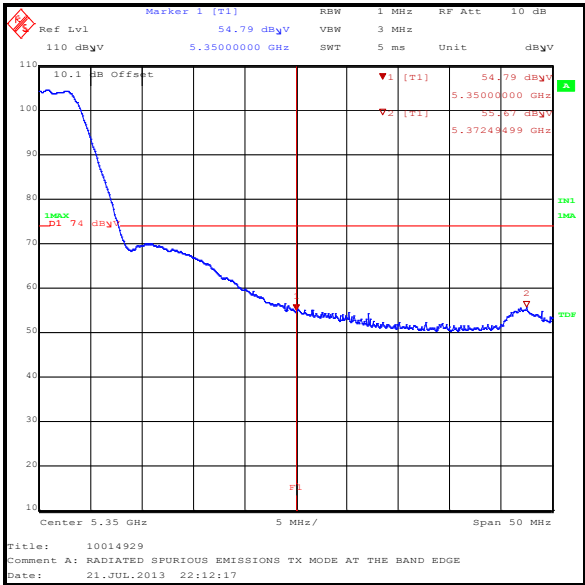
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	40.1	N/A	N/A	54.0	13.9	Complied
5371.954	44.5	N/A	N/A	54.0	9.5	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

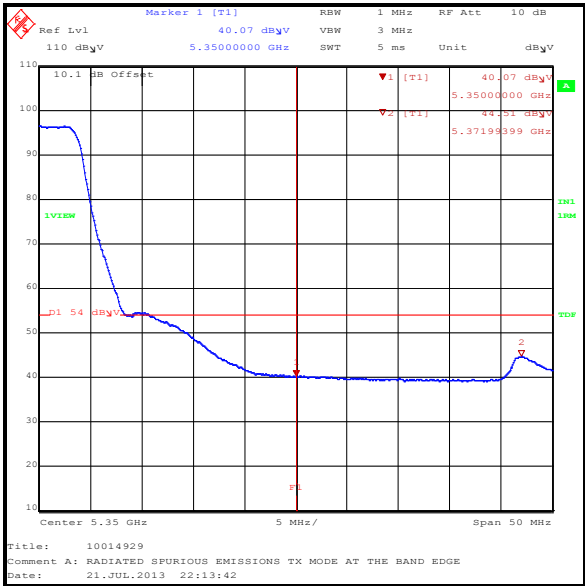
Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	64.2	74.0	9.8	Complied
5350.301	65.0	74.0	9.0	Complied

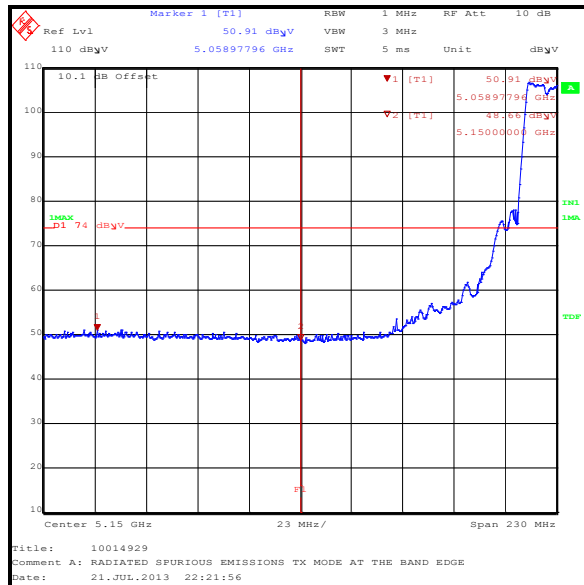
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5058.978	50.9	54.0	3.1	Complied
5150	48.7	54.0	5.3	Complied

Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Average

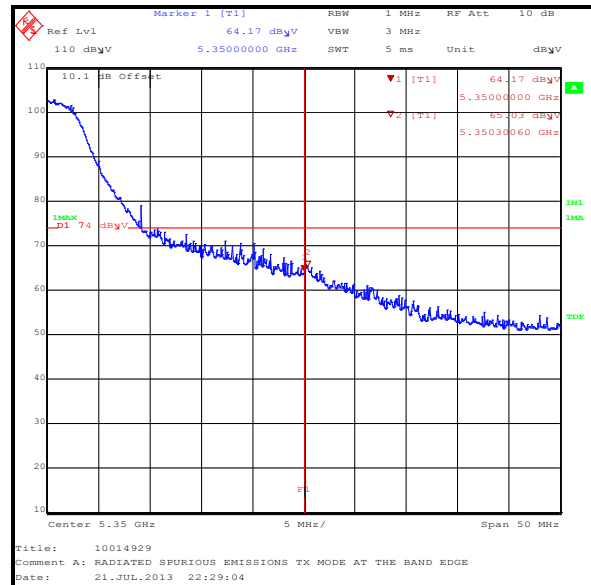
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	44.6	N/A	N/A	54.0	9.4	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

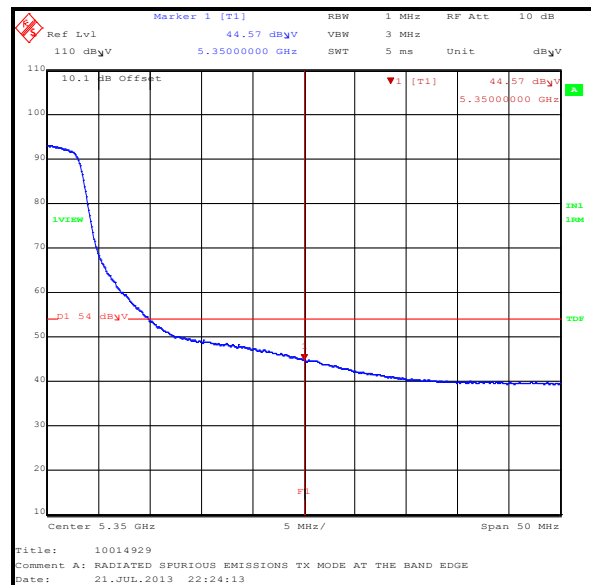
Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	63.6	74.0	10.4	Complied
5350.501	64.8	74.0	9.2	Complied

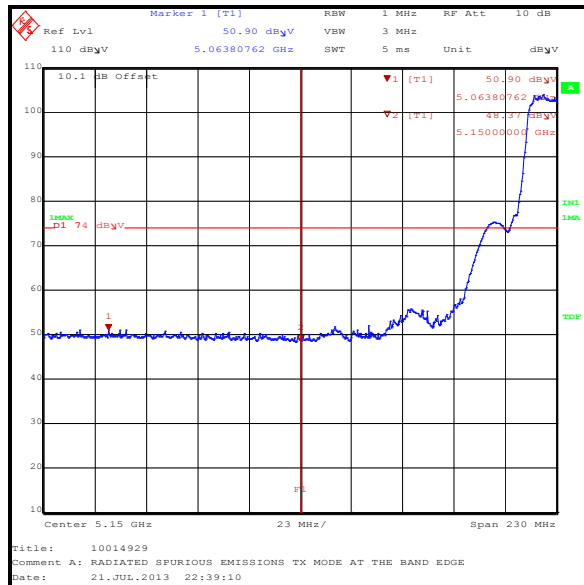
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5063.808	50.9	54.0	3.1	Complied
5150	48.4	54.0	5.6	Complied

Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3 / Average

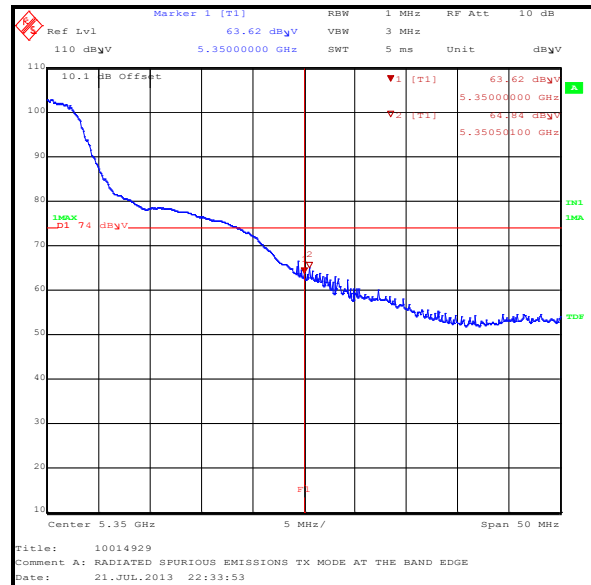
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	44.6	N/A	N/A	54.0	9.4	Complied
5350.501	45.1	N/A	N/A	54.0	8.9	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

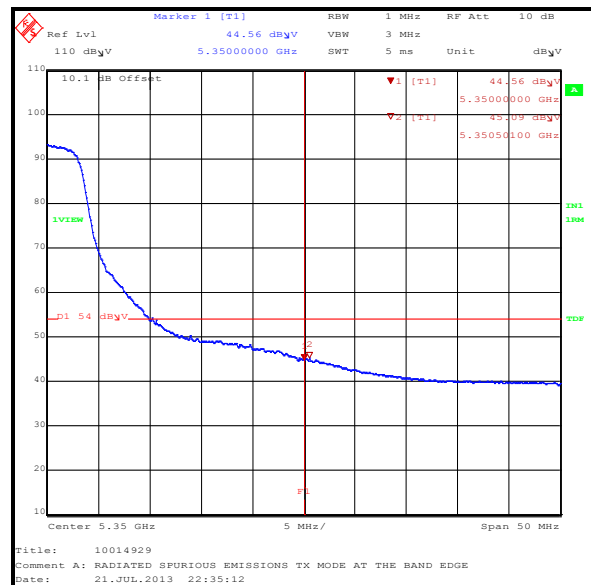
Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	60.3	74.0	13.7	Complied
5350.802	61.6	74.0	12.4	Complied

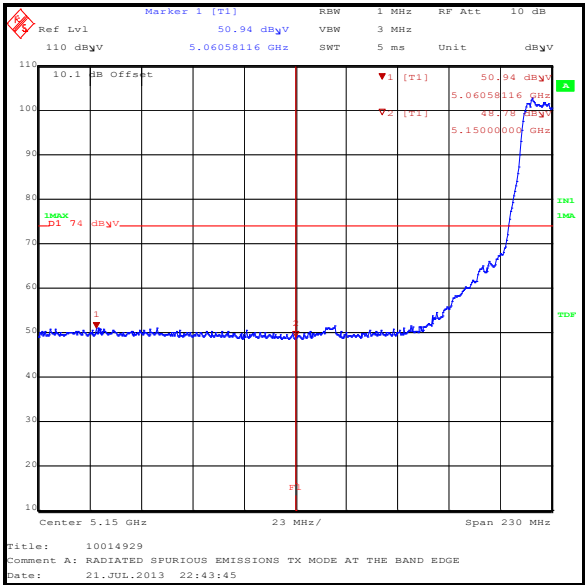
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5060.581	50.9	54.0	3.1	Complied
5150	48.8	54.0	5.2	Complied

Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1 / Average

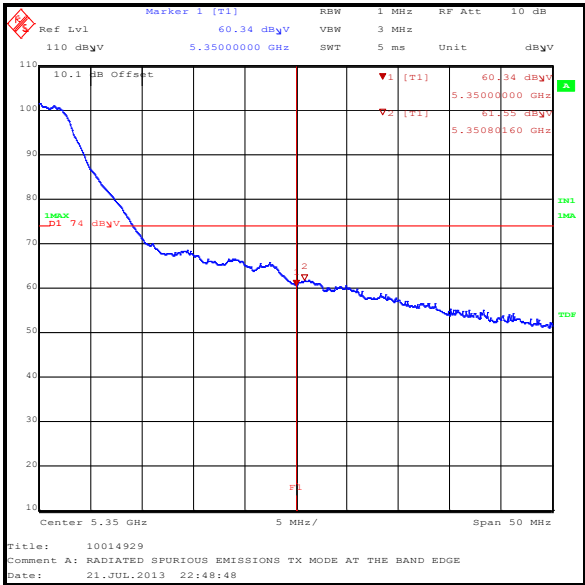
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	44.9	0.2	45.1	54.0	8.9	Complied
5350.200	45.0	0.2	45.2	54.0	8.8	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

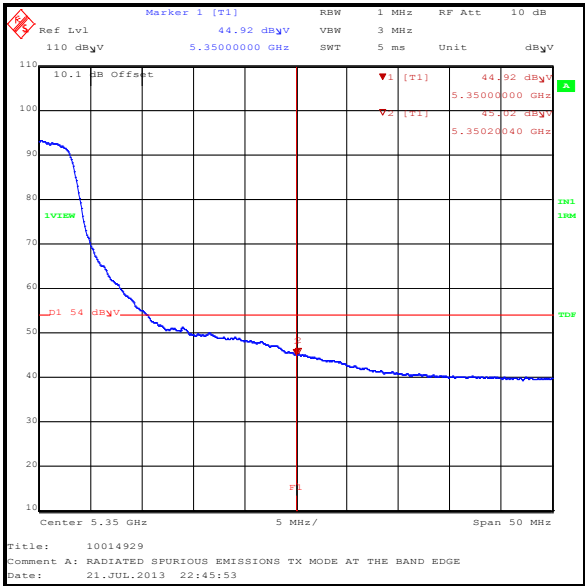
Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	59.6	74.0	14.4	Complied
5350.701	59.9	74.0	14.1	Complied

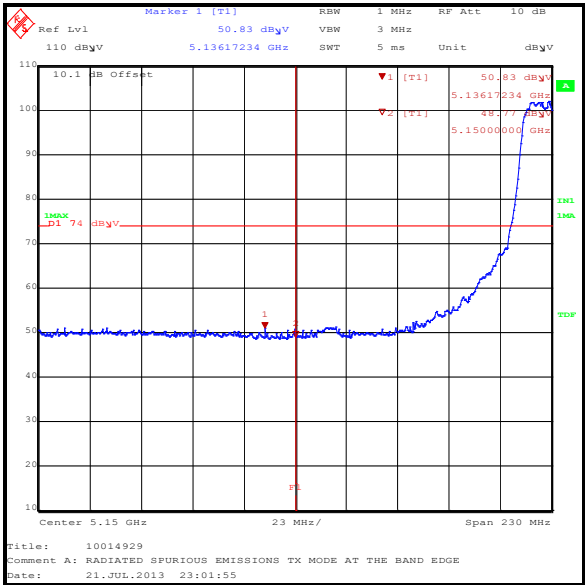
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5136.172	50.8	54.0	3.2	Complied
5150	48.8	54.0	5.2	Complied

Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / Average

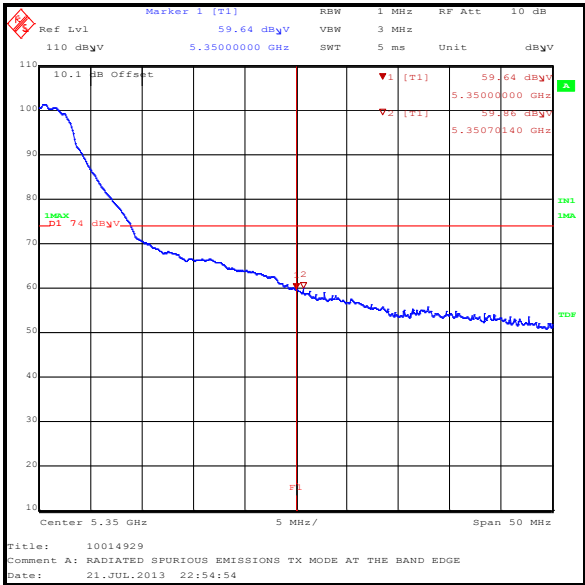
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	44.5	0.4	44.9	54.0	9.1	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

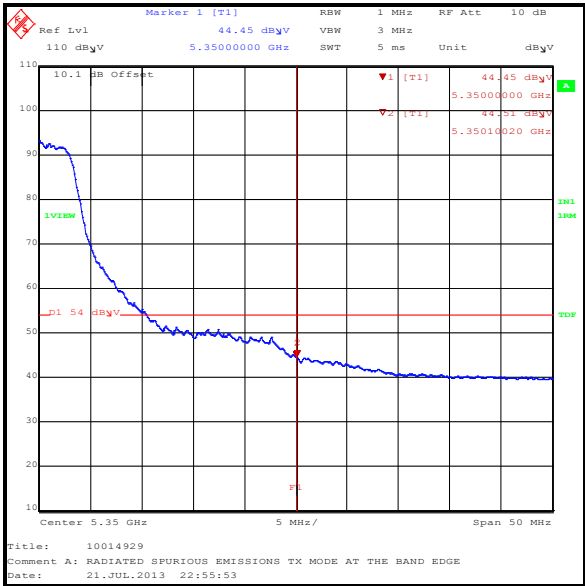
Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	58.3	74.0	15.7	Complied
5361.323	63.5	74.0	10.5	Complied

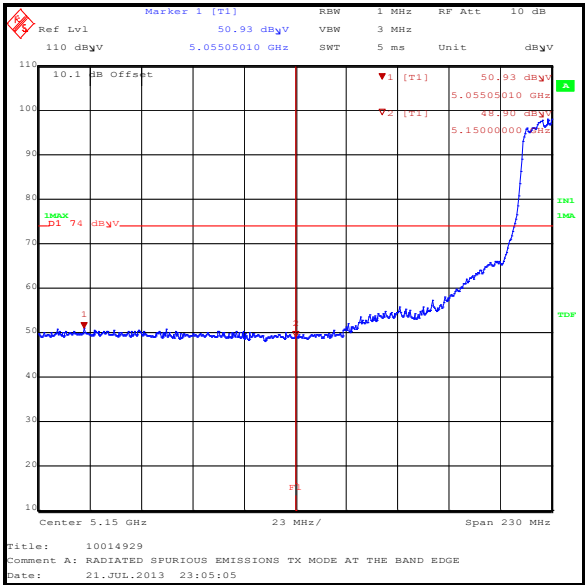
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5055.050	50.9	54.0	3.1	Complied
5150	48.9	54.0	5.1	Complied

Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Average

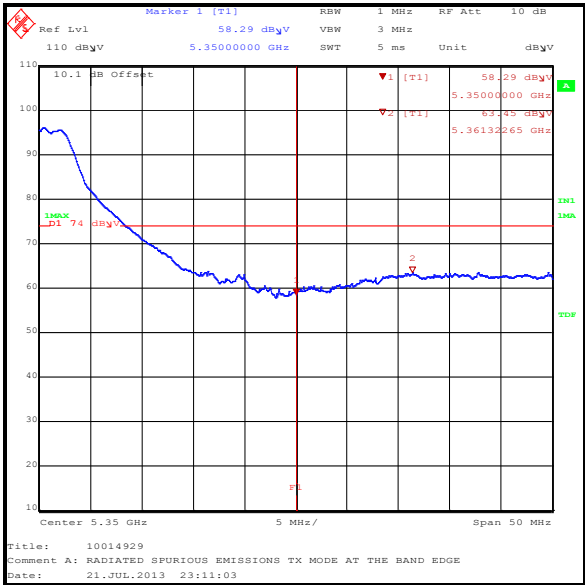
Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	45.6	0.2	45.8	54.0	8.2	Complied
5350.701	46.0	0.2	46.2	54.0	7.8	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

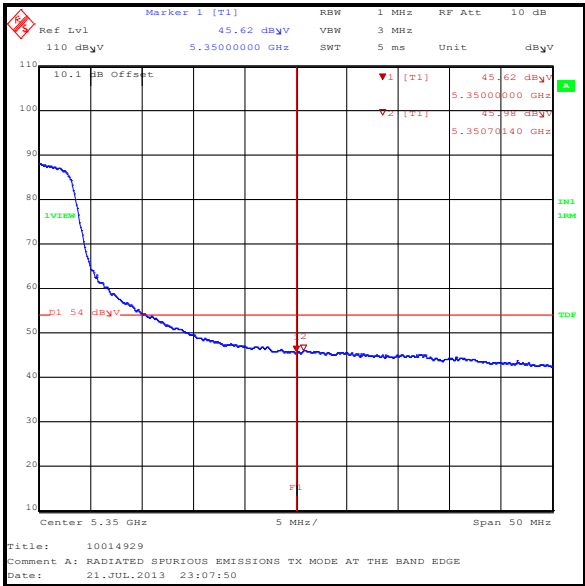
Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Peak**

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	58.9	74.0	15.1	Complied
5363.928	63.7	74.0	10.3	Complied

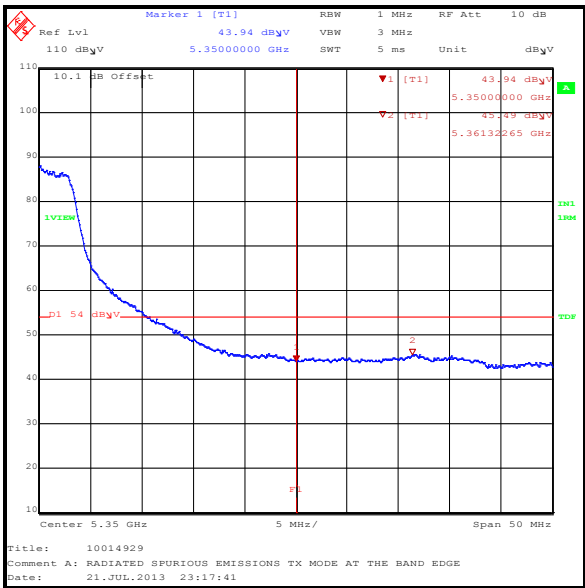
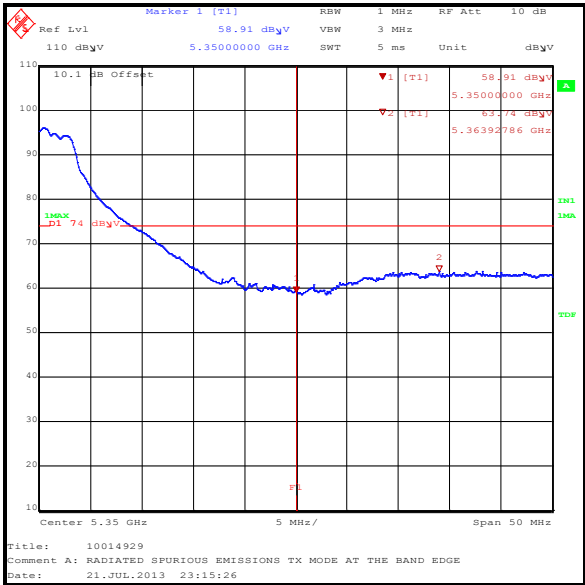
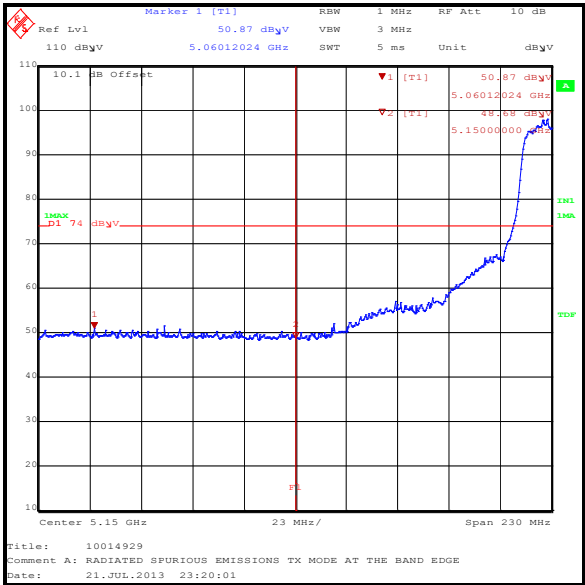
Frequency (MHz)	Peak Level (dB μ V/m)	Average Limit (dB μ V/m)	Margin (dB)	Result
5060.120	50.9	54.0	3.1	Complied
5150	48.7	54.0	5.3	Complied

Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Average

Frequency (MHz)	Level (dB μ V/m)	Duty Cycle correction (dB)	Corrected Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5350	43.9	0.6	44.5	54.0	9.5	Complied
5361.323	45.5	0.6	46.1	54.0	7.9	Complied

Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7



Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	23 July 2013
Test Sample IMEI:	004402451245827		

FCC Reference:	Parts 15.407(b)(3), 15.407(b)(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.9.2 & FCC KDB 789033 H)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	43

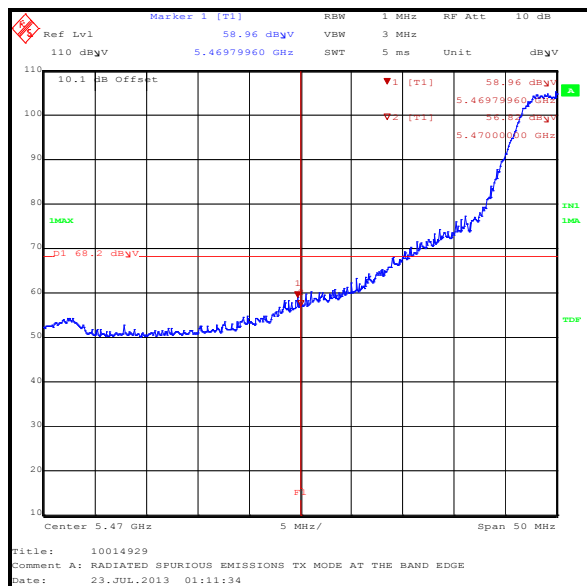
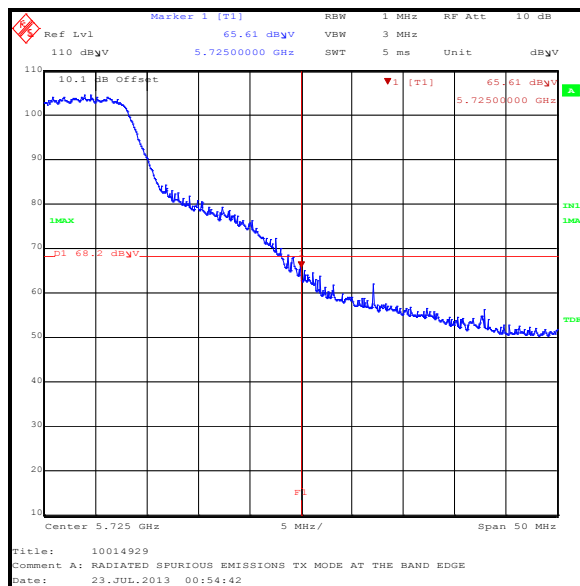
Note(s):

1. An Inquiry was made to the FCC and the response confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
 - 802.11a - QPSK / 12 Mbps.
 - 802.11n HT20 - QPSK / 19.5 Mbps / MCS2 (GI = 800ns).
 - 802.11n HT40 - QPSK / 27 Mbps / MCS1 (GI = 800ns) & 16QAM / 60 Mbps / MCS3 (GI = 400ns).
 - 802.11ac VHT20 - BPSK / 7.2 Mbps / MCS0 (GI = 400ns) & QPSK / 14.4 Mbps / MCS1 (GI = 400ns).
 - 802.11ac VHT40 - QPSK / 30 Mbps / MCS1 (GI = 400ns) & 64QAM / 120 Mbps / MCS5 (GI = 400ns).
 - 802.11ac VHT80 – BPSK / 32.5 Mbps / MCS0 (GI = 400ns) & 64QAM / 325 Mbps / MCS7 (GI = 400ns).
2. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
3. For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply. Tests were performed in these restricted bands of operation with the EUT transmitting on the bottom and top channels within 5.47-5.725 GHz band, the results are included in the transmitter 5.47-5.725 GHz band radiated spurious emissions section of this test report.
4. For completeness, results are also shown as EIRP measured at a distance of 3 metres in dBm and also as field strength in dBµV/m. Measured field strength was converted to EIRP in accordance with FCC KDB 789033 H)2)d(i) using a conversion factor of 95.2.

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5469.800	-36.2	-27.0	9.2	Complied
5470	-38.4	-27.0	11.4	Complied
5725	-29.6	-27.0	2.6	Complied

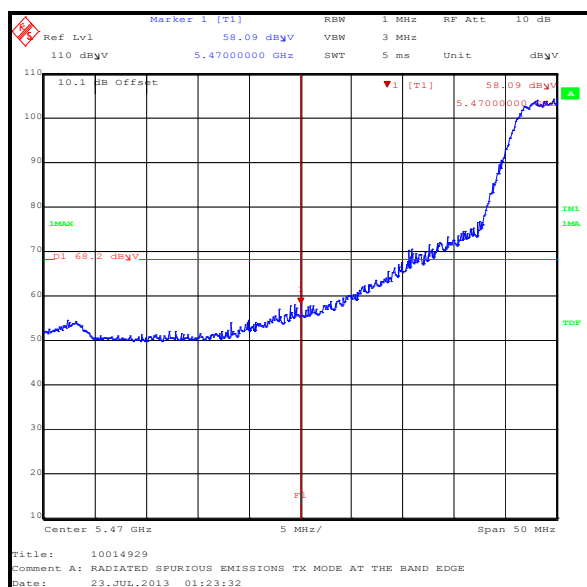
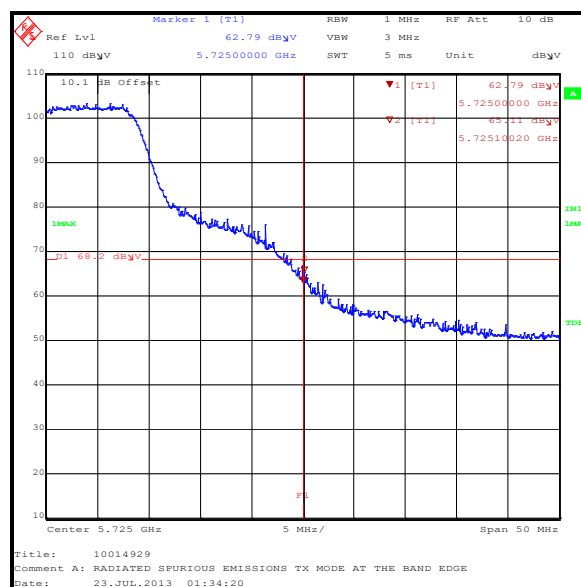
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5469.800	59.0	68.2	9.2	Complied
5470	56.8	68.2	11.4	Complied
5725	65.6	68.2	2.6	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-37.1	-27.0	10.1	Complied
5725	-32.4	-27.0	5.4	Complied
5725.100	-30.1	-27.0	3.1	Complied

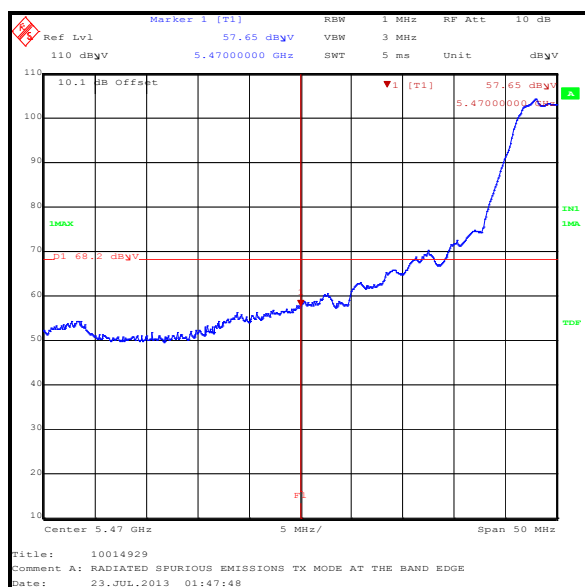
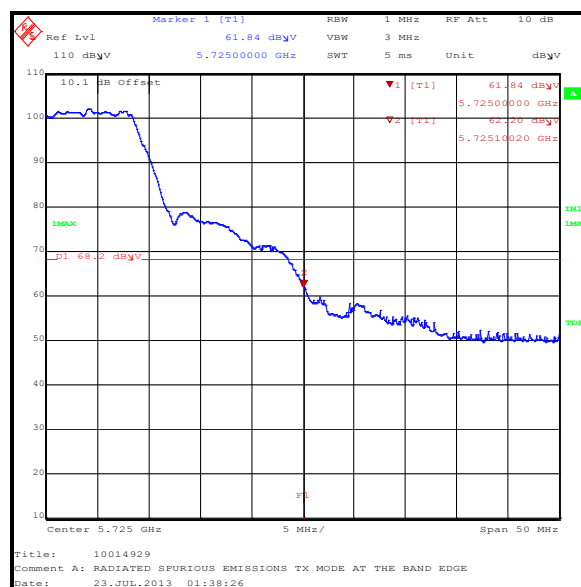
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5470	58.1	68.2	10.1	Complied
5725	62.8	68.2	5.4	Complied
5725.100	65.1	68.2	3.1	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-37.5	-27.0	10.5	Complied
5725	-33.4	-27.0	6.4	Complied
5725.100	-33.0	-27.0	6.0	Complied

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5470	57.7	68.2	10.5	Complied
5725	61.8	68.2	6.4	Complied
5725.100	62.2	68.2	6.0	Complied

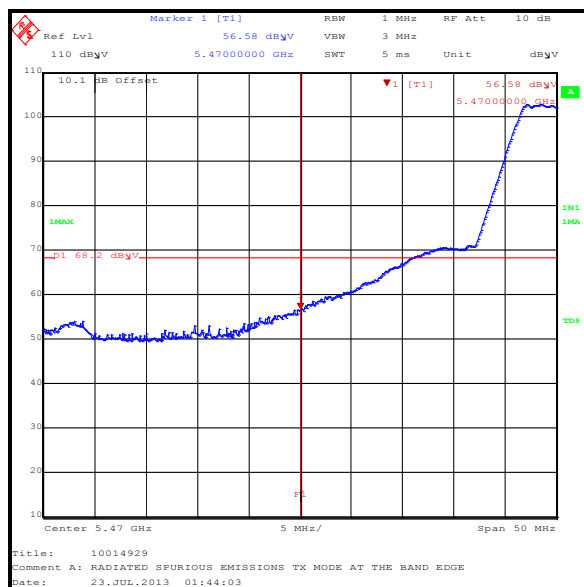
**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)

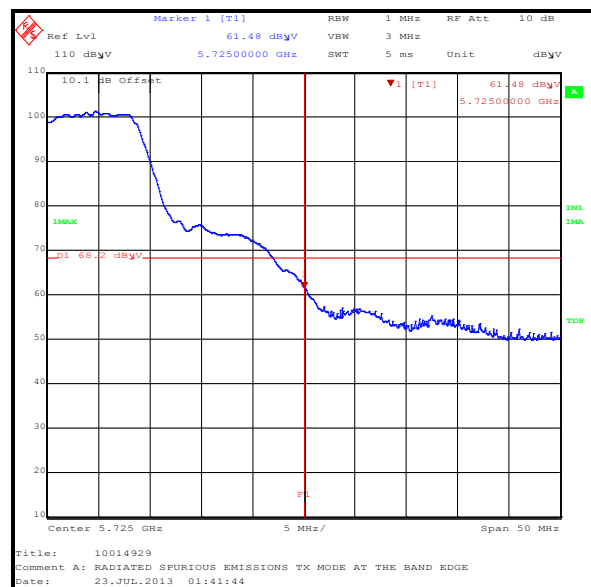
Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-38.6	-27.0	11.6	Complied
5725	-33.7	-27.0	6.7	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5470	56.6	68.2	11.6	Complied
5725	61.5	68.2	6.7	Complied



Lower Band Edge Measurement

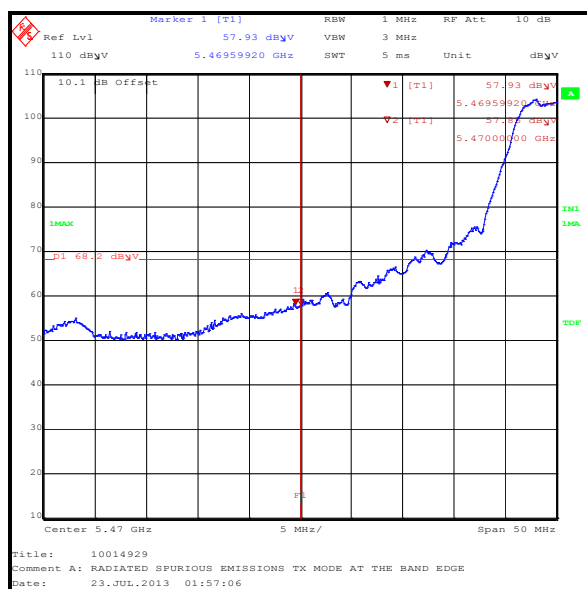
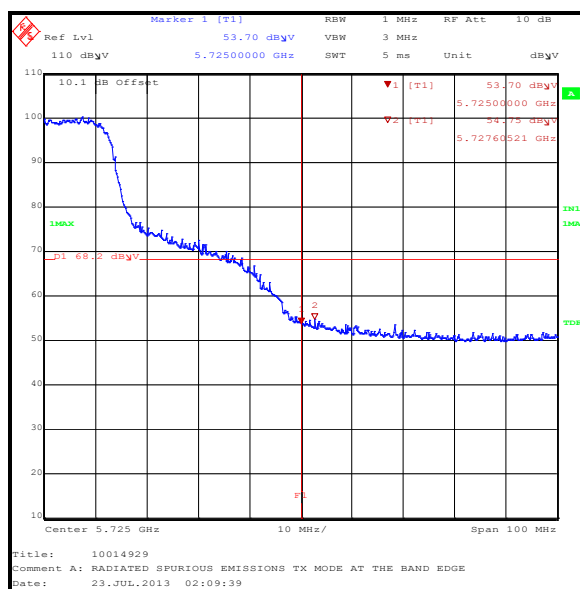


Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-37.3	-27.0	10.3	Complied
5725	-41.5	-27.0	14.5	Complied
5727.605	-40.4	-27.0	13.4	Complied

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5470	57.9	68.2	10.3	Complied
5725	53.7	68.2	14.5	Complied
5727.605	54.8	68.2	13.4	Complied

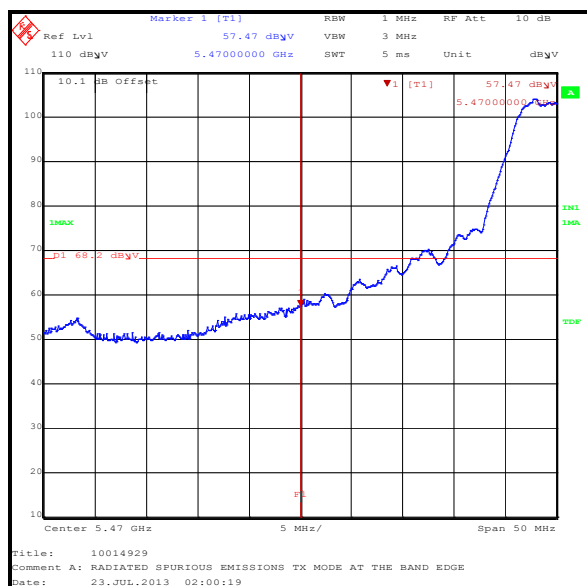
**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)

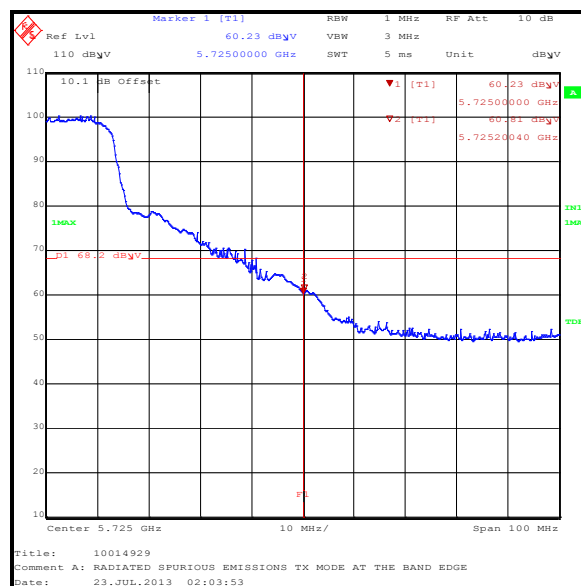
Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-37.7	-27.0	10.7	Complied
5725	-35.0	-27.0	8.0	Complied
5725.200	-34.4	-27.0	7.4	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5470	57.5	68.2	10.7	Complied
5725	60.2	68.2	8.0	Complied
5725.200	60.8	68.2	7.4	Complied



Lower Band Edge Measurement

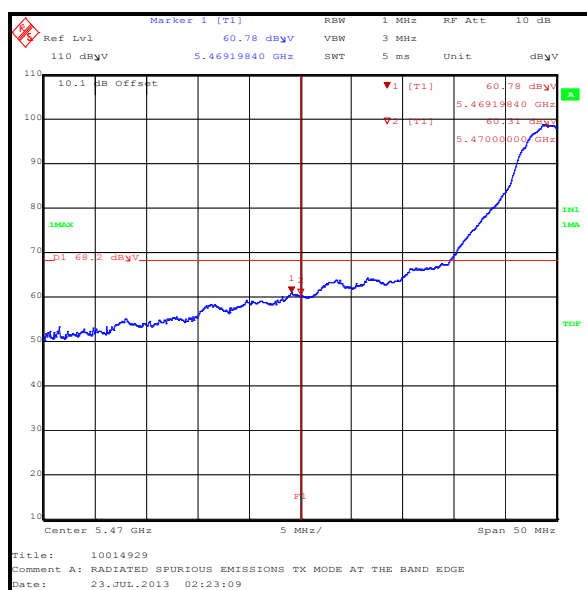
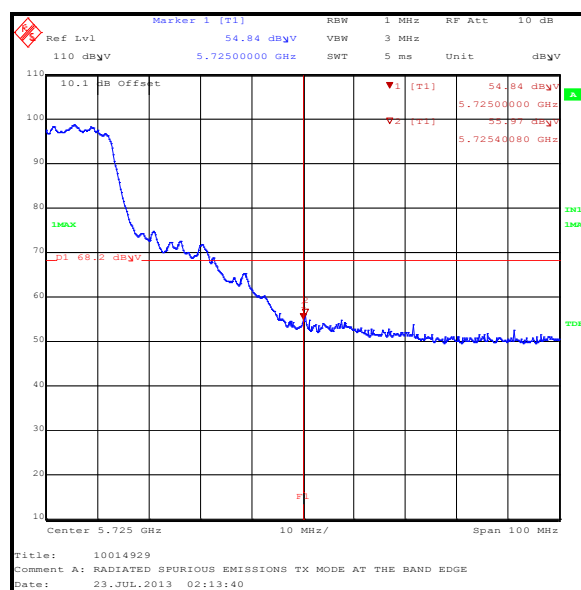


Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5469.198	-34.4	-27.0	7.4	Complied
5470	-34.9	-27.0	7.9	Complied
5725	-40.4	-27.0	13.4	Complied
5725.401	-39.2	-27.0	12.2	Complied

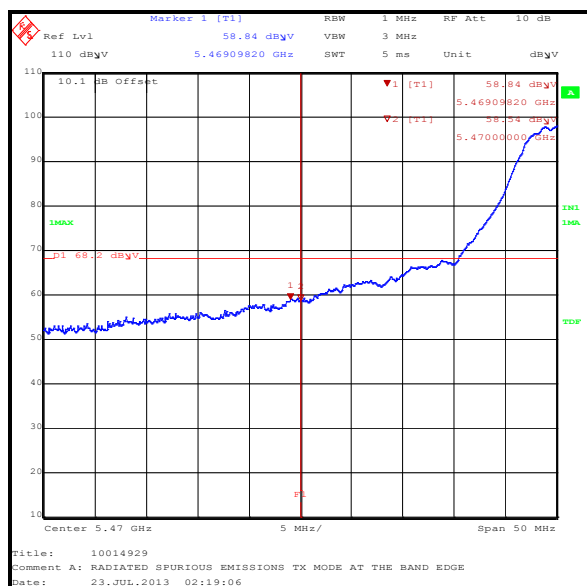
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5469.198	60.8	68.2	7.4	Complied
5470	60.3	68.2	7.9	Complied
5725	54.8	68.2	13.4	Complied
5725.401	56.0	68.2	12.2	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

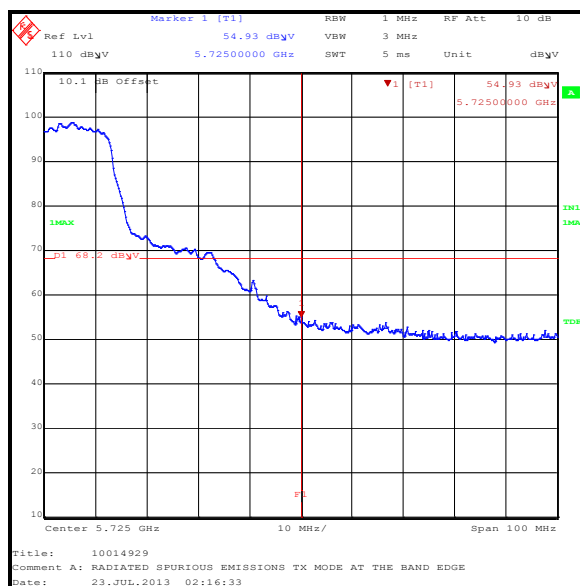
Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5469.098	-36.4	-27.0	9.4	Complied
5470	-36.7	-27.0	9.7	Complied
5725	-40.3	-27.0	13.3	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5469.098	58.8	68.2	9.4	Complied
5470	58.5	68.2	9.7	Complied
5725	54.9	68.2	13.3	Complied



Lower Band Edge Measurement



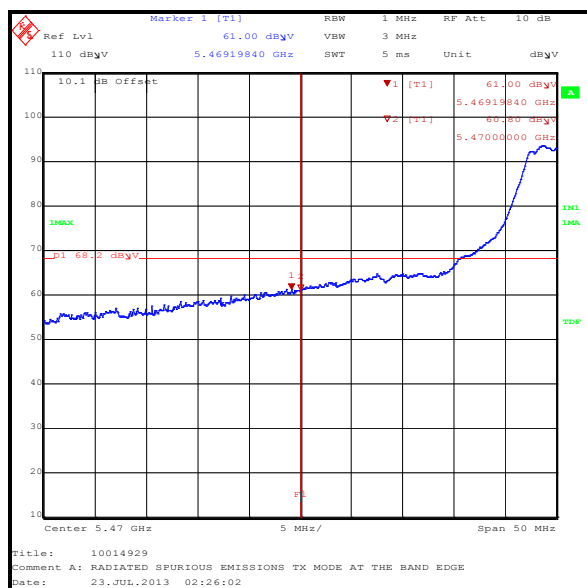
Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)

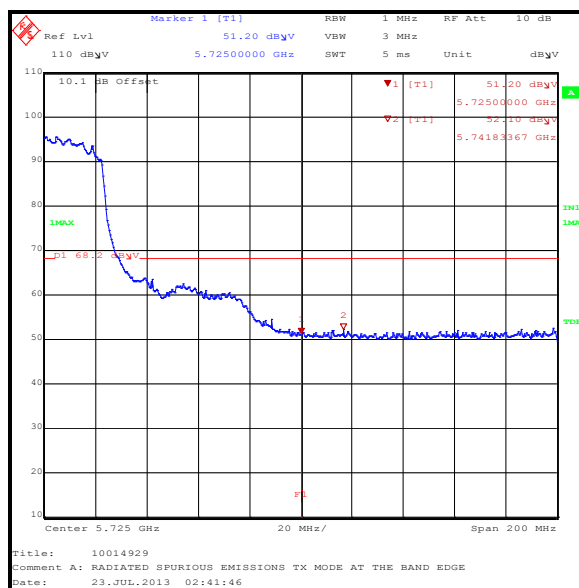
Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5469.198	-34.2	-27.0	7.2	Complied
5470	-34.4	-27.0	7.4	Complied
5725	-44.0	-27.0	17.0	Complied
5741.834	-43.1	-27.0	16.1	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5469.198	61.0	68.2	7.2	Complied
5470	60.8	68.2	7.4	Complied
5725	51.2	68.2	17.0	Complied
5741.834	52.1	68.2	16.1	Complied



Lower Band Edge Measurement



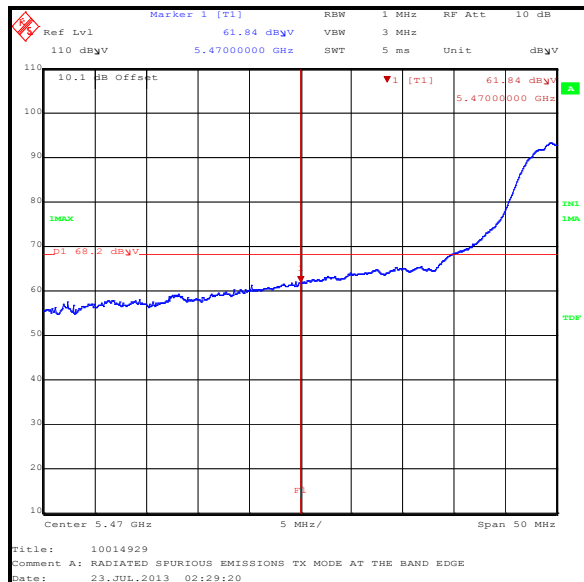
Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation) (continued)

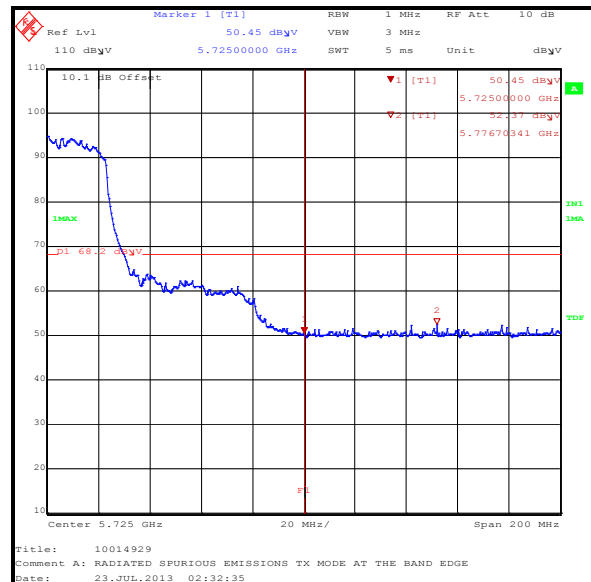
Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5470	-33.4	-27.0	6.4	Complied
5725	-44.7	-27.0	17.7	Complied
5776.703	-42.8	-27.0	15.8	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5470	61.8	68.2	6.4	Complied
5725	50.5	68.2	17.7	Complied
5776.703	52.4	68.2	15.8	Complied



Lower Band Edge Measurement



Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band)**Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	23 July 2013
Test Sample IMEI:	004402451245827		

FCC Reference:	Parts 15.407(b)(4), 15.407(b)(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.9.2 & FCC KDB 789033 H)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	41

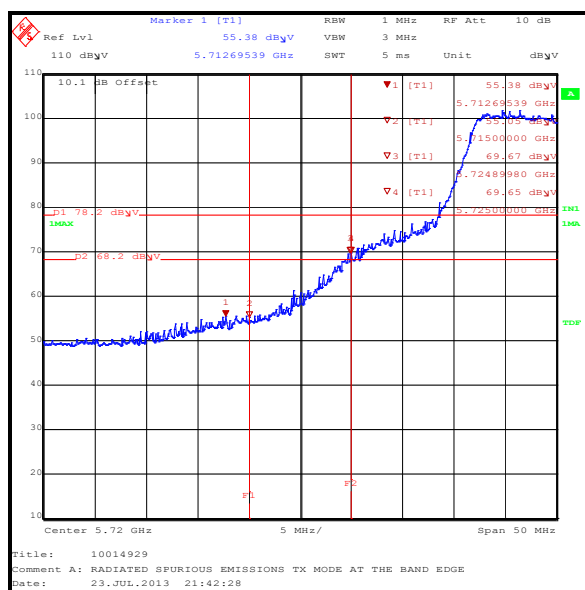
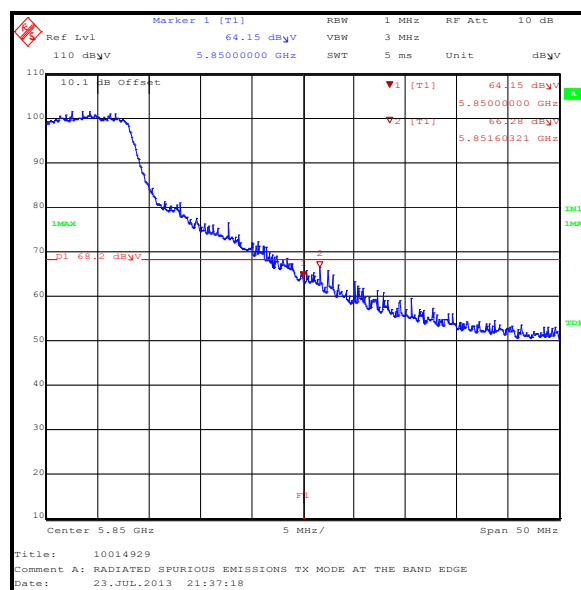
Note(s):

1. An Inquiry was made to the FCC and the response confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
 - 802.11a - QPSK / 12 Mbps.
 - 802.11n HT20 - QPSK / 19.5 Mbps / MCS2 (GI = 800ns).
 - 802.11n HT40 - QPSK / 27 Mbps / MCS1 (GI = 800ns) & 16QAM / 60 Mbps / MCS3 (GI = 400ns).
 - 802.11ac VHT20 - QPSK / 14.4 Mbps / MCS1 (GI = 400ns) & BPSK / 7.2 Mbps / MCS0 (GI = 400ns).
 - 802.11ac VHT40 - QPSK / 30 Mbps / MCS1 (GI = 400ns) & 64QAM / 120 Mbps / MCS5 (GI = 400ns).
 - 802.11ac VHT80 – 64QAM / 325 Mbps / MCS7 (GI = 400ns) & BPSK / 32.5 Mbps / MCS0 (GI = 400ns).
2. Lower band edge measurements were performed with the EUT transmitting on the bottom channel. Upper band edge measurements were performed with the EUT transmitting on the top channel.
3. The EUT is capable of transmitting on channel 165 at 5825 MHz and therefore operates under Part 15.407 in the UNII band as well as Part 15.247 in the DTS band. The out of band emission limit at the DTS upper band edge frequency of 5850 MHz is -27 dBm in accordance with FCC KDB 644545 D02 Page1, Note 1 and Section D.
4. For completeness, results are also shown as EIRP measured at a distance of 3 metres in dBm and also as field strength in dBµV/m. Measured field strength was converted to EIRP in accordance with FCC KDB 789033 H)2)d)(i) using a conversion factor of 95.2.

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11a / 20 MHz / QPSK / 12 Mbps / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5712.695	-39.8	-27.0	12.8	Complied
5715	-40.1	-27.0	13.1	Complied
5725	-25.5	-17.0	8.5	Complied
5850	-31.0	-27.0	4.0	Complied
5851.603	-28.9	-27.0	1.9	Complied

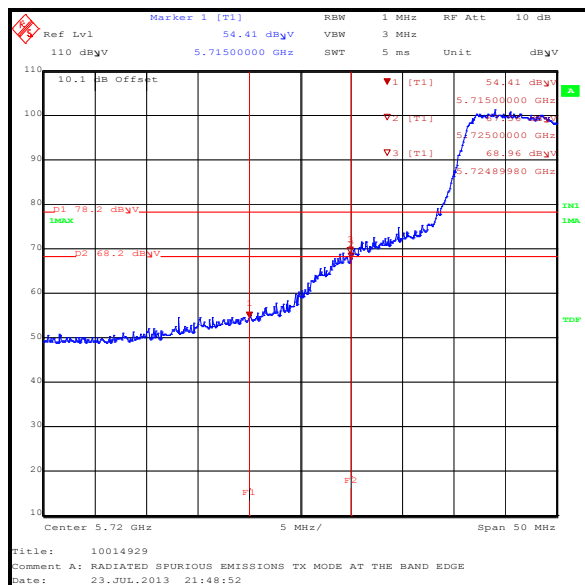
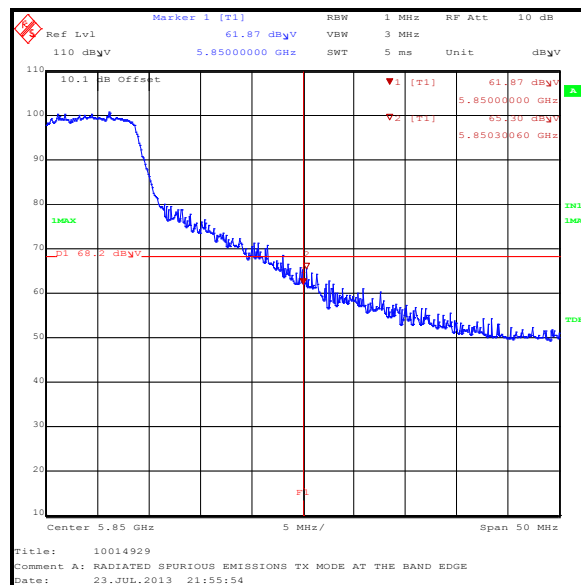
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5712.695	55.4	68.2	12.8	Complied
5715	55.1	68.2	13.1	Complied
5725	69.7	78.2	8.5	Complied
5850	64.2	68.2	4.0	Complied
5851.603	66.3	68.2	1.9	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11n / 20 MHz / QPSK / 19.5 Mbps / MCS2 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715	-40.8	-27.0	13.8	Complied
5724.900	-26.2	-17.0	9.2	Complied
5725	-27.6	-17.0	10.6	Complied
5850	-33.3	-27.0	6.3	Complied
5850.301	-29.9	-27.0	2.9	Complied

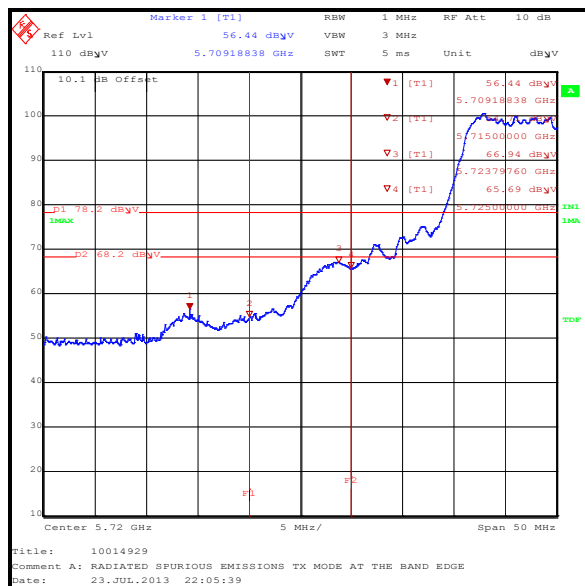
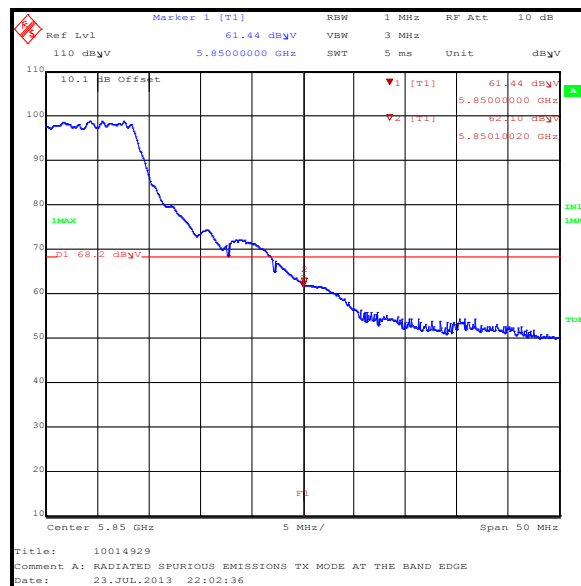
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5715	54.4	68.2	13.8	Complied
5724.900	69.0	78.2	9.2	Complied
5725	67.6	78.2	10.6	Complied
5850	61.9	68.2	6.3	Complied
5850.301	65.3	68.2	2.9	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / BPSK / 7.2 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5709.188	-38.8	-27.0	11.8	Complied
5715	-40.5	-27.0	13.5	Complied
5723.798	-28.3	-17.0	11.3	Complied
5725	-29.5	-17.0	12.5	Complied
5850	-33.8	-27.0	6.8	Complied
5850.100	-33.1	-27.0	6.1	Complied

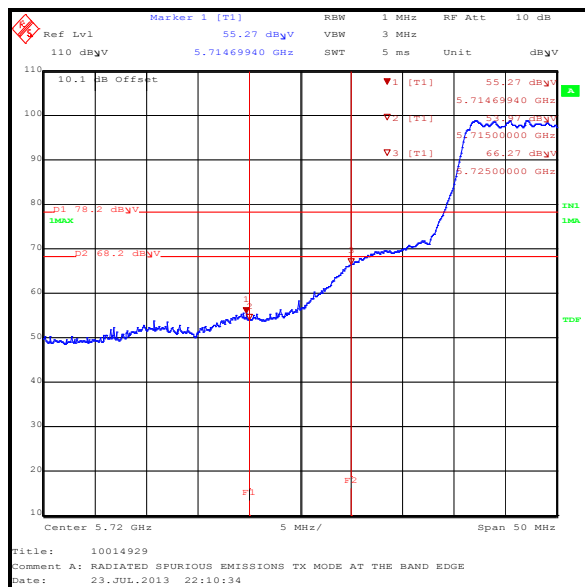
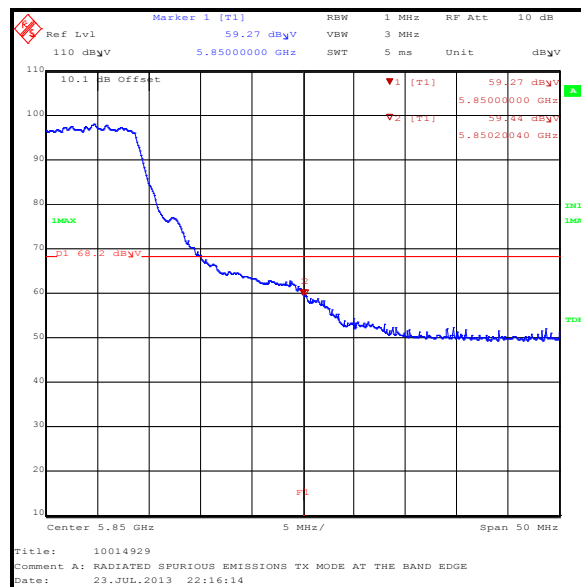
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5709.188	56.4	68.2	11.8	Complied
5715	54.7	68.2	13.5	Complied
5723.798	66.9	78.2	11.3	Complied
5725	65.7	78.2	12.5	Complied
5850	61.4	68.2	6.8	Complied
5850.100	62.1	68.2	6.1	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11ac / 20 MHz / QPSK / 14.4 Mbps / MCS1 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.699	-39.9	-27.0	12.9	Complied
5715	-41.2	-27.0	14.2	Complied
5725	-28.9	-17.0	11.9	Complied
5850	-35.9	-27.0	8.9	Complied
5850.200	-35.8	-27.0	8.8	Complied

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5714.699	55.3	68.2	12.9	Complied
5715	54.0	68.2	14.2	Complied
5725	66.3	78.2	11.9	Complied
5850	59.3	68.2	8.9	Complied
5850.200	59.4	68.2	8.8	Complied

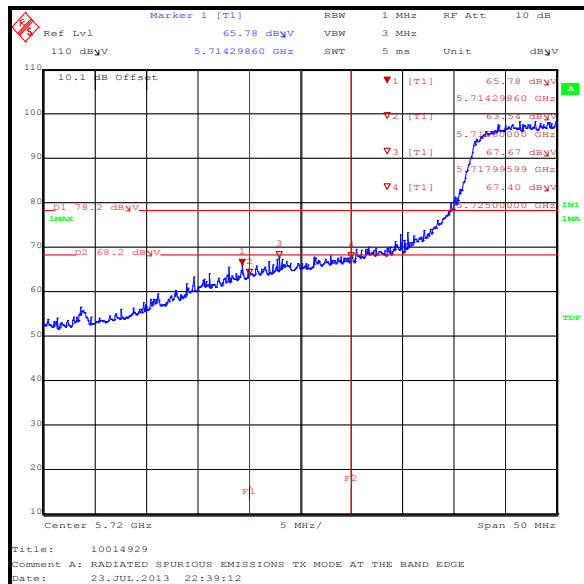
**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)

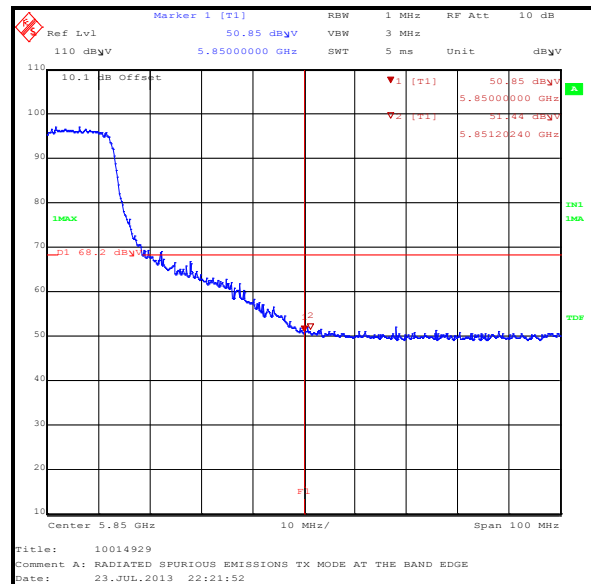
Results: 802.11n / 40 MHz / QPSK / 27 Mbps / MCS1 / Peak

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.299	-29.4	-27.0	2.4	Complied
5715	-31.7	-27.0	4.7	Complied
5717.996	-27.5	-17.0	10.5	Complied
5725	-27.8	-17.0	10.8	Complied
5850	-44.3	-27.0	17.3	Complied
5851.202	-43.8	-27.0	16.8	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5714.299	65.8	68.2	2.4	Complied
5715	63.5	68.2	4.7	Complied
5717.996	67.7	78.2	10.5	Complied
5725	67.4	78.2	10.8	Complied
5850	50.9	68.2	17.3	Complied
5851.202	51.4	68.2	16.8	Complied



Lower Band Edge Measurement

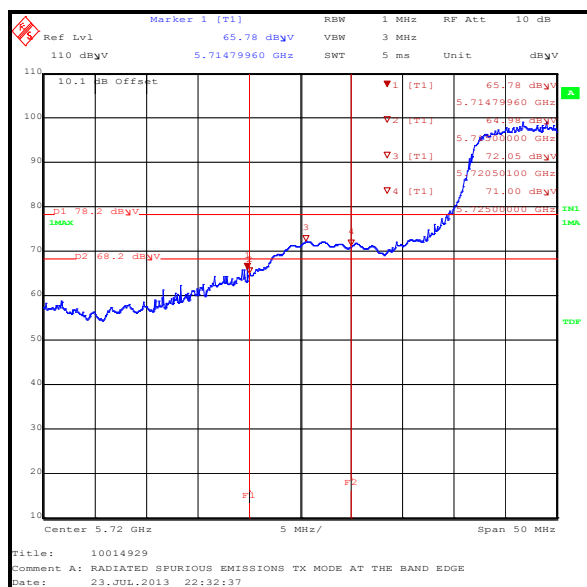
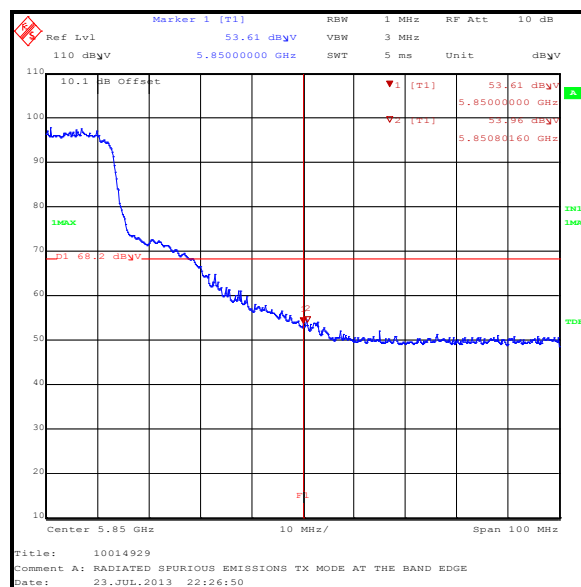


Upper Band Edge Measurement

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11n / 40 MHz / 16QAM / 60 Mbps / MCS3/ Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5714.800	-29.4	-27.0	2.4	Complied
5715	-30.2	-27.0	3.2	Complied
5720.501	-23.1	-17.0	6.1	Complied
5725	-24.2	-17.0	7.2	Complied
5850	-41.6	-27.0	14.6	Complied
5850.802	-41.2	-27.0	14.2	Complied

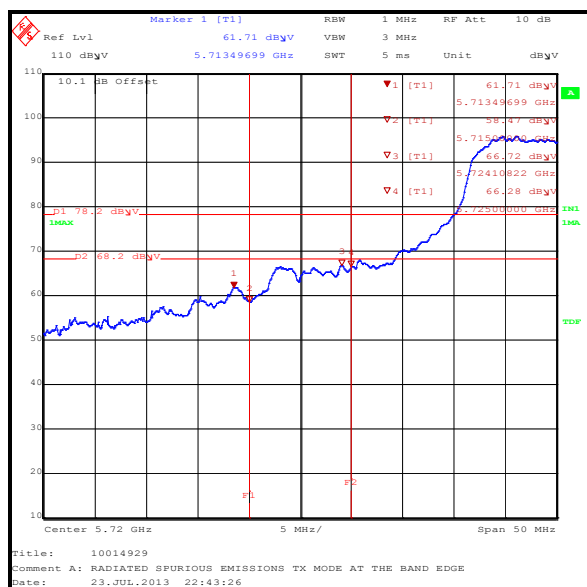
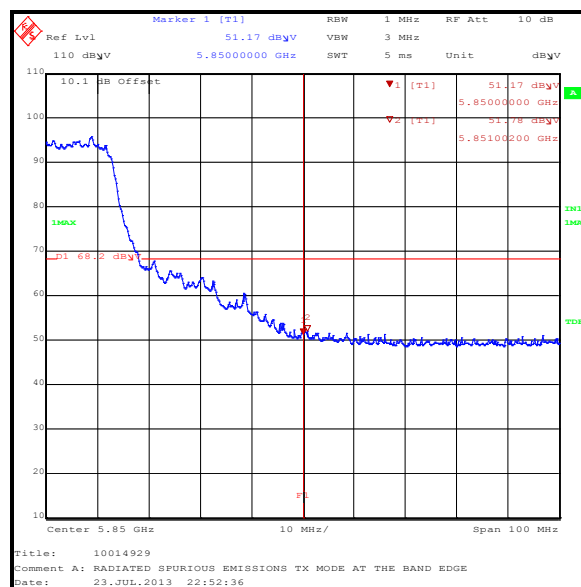
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5714.800	65.8	68.2	2.4	Complied
5715	65.0	68.2	3.2	Complied
5720.501	72.1	78.2	6.1	Complied
5725	71.0	78.2	7.2	Complied
5850	53.6	68.2	14.6	Complied
5850.802	54.0	68.2	14.2	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11ac / 40 MHz / QPSK / 30 Mbps / MCS1/ Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5713.497	-33.5	-27.0	6.5	Complied
5715	-36.7	-27.0	9.7	Complied
5724.108	-28.5	-17.0	11.5	Complied
5725	-28.9	-17.0	11.9	Complied
5850	-44.0	-27.0	17.0	Complied
5851.002	-43.4	-27.0	16.4	Complied

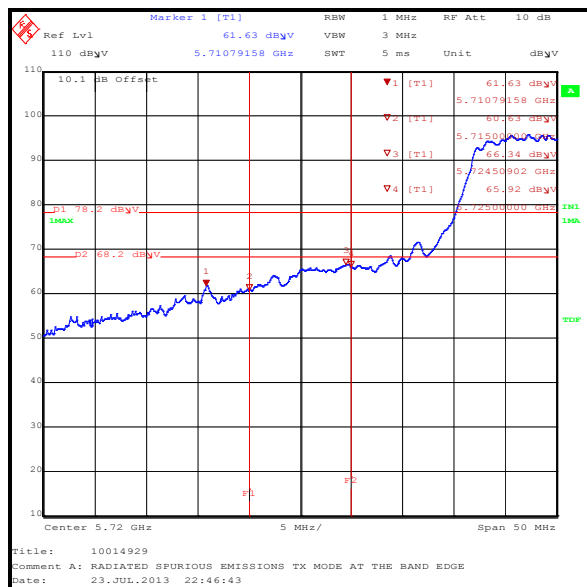
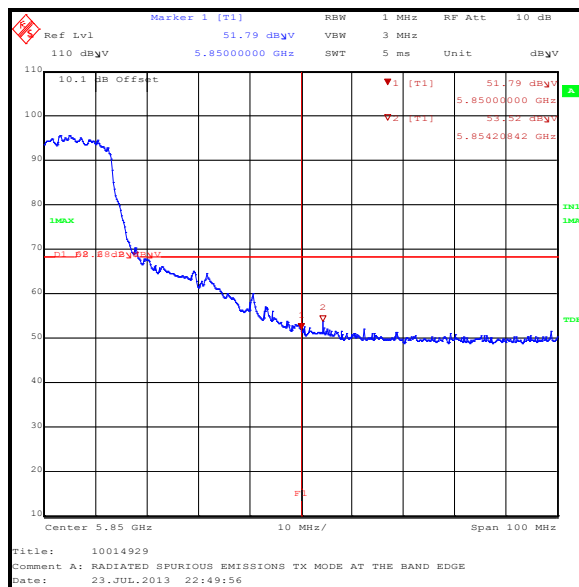
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5713.497	61.7	68.2	6.5	Complied
5715	58.5	68.2	9.7	Complied
5724.108	66.7	78.2	11.5	Complied
5725	66.3	78.2	11.9	Complied
5850	51.2	68.2	17.0	Complied
5851.002	51.8	68.2	16.4	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz operation) (continued)**Results: 802.11ac / 40 MHz / 64QAM / 120 Mbps / MCS5/ Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5710.792	-33.6	-27.0	6.6	Complied
5715	-34.6	-27.0	7.6	Complied
5724.509	-28.9	-17.0	11.9	Complied
5725	-29.3	-17.0	12.3	Complied
5850	-43.4	-27.0	16.4	Complied
5854.208	-41.7	-27.0	14.7	Complied

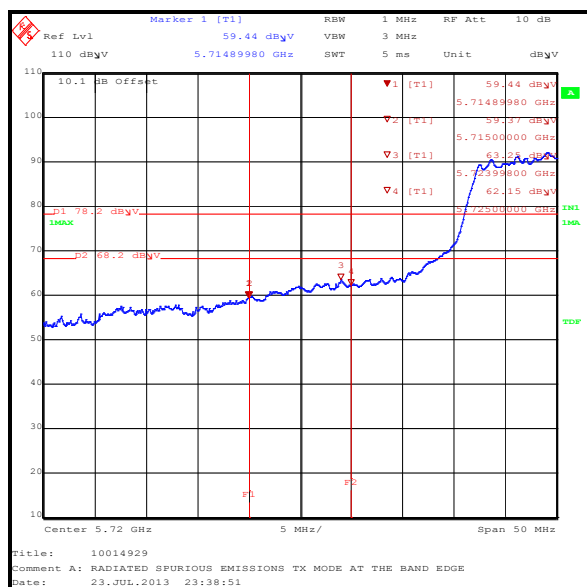
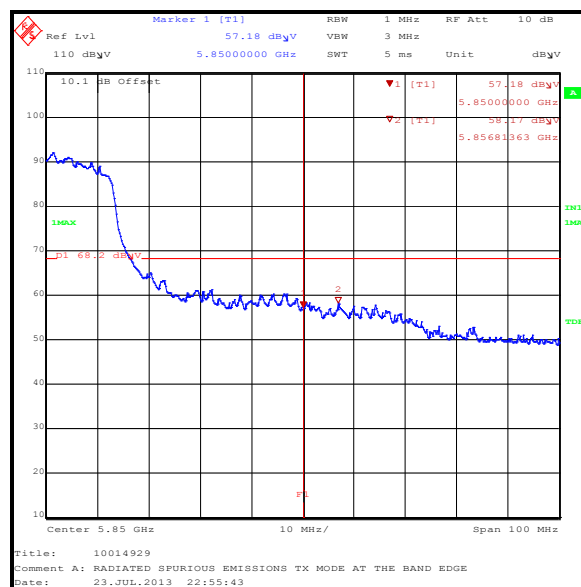
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5710.792	61.6	68.2	6.6	Complied
5715	60.6	68.2	7.6	Complied
5724.509	66.3	78.2	11.9	Complied
5725	65.9	78.2	12.3	Complied
5850	51.8	68.2	16.4	Complied
5854.208	53.5	68.2	14.7	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / BPSK / 32.5 Mbps / MCS0 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715	-35.8	-27.0	8.8	Complied
5723.998	-31.9	-17.0	14.9	Complied
5725	-33.0	-17.0	16.0	Complied
5850	-38.0	-27.0	11.0	Complied
5856.814	-37.0	-27.0	10.0	Complied

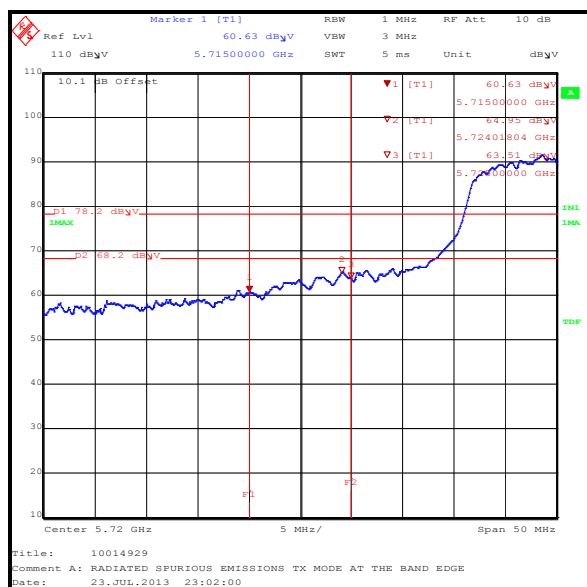
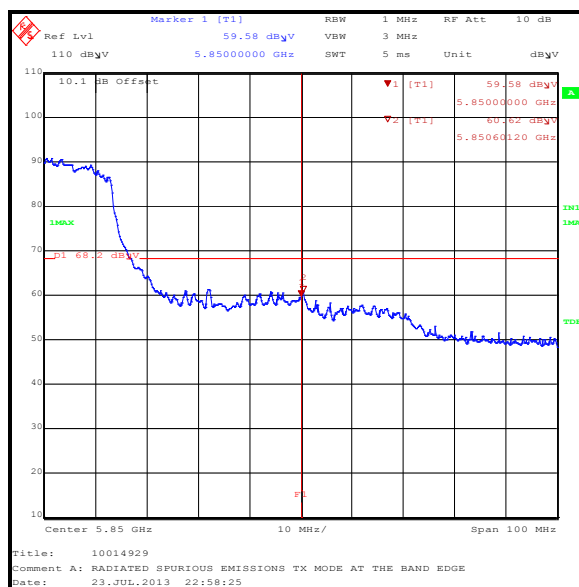
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
5715	59.4	68.2	8.8	Complied
5723.998	63.3	78.2	14.9	Complied
5725	62.2	78.2	16.0	Complied
5850	57.2	68.2	11.0	Complied
5856.814	58.2	68.2	10.0	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation) (continued)**Results: 802.11ac / 80 MHz / 64QAM / 325 Mbps / MCS7 / Peak**

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5715	-34.6	-27.0	7.6	Complied
5724.018	-30.2	-17.0	3.2	Complied
5725	-31.7	-17.0	4.7	Complied
5850	-35.6	-27.0	8.6	Complied
5850.601	-34.6	-27.0	7.6	Complied

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
5715	60.6	68.2	7.6	Complied
5724.018	65.0	78.2	3.2	Complied
5725	63.5	78.2	4.7	Complied
5850	59.6	68.2	8.6	Complied
5850.601	60.6	68.2	7.6	Complied

**Lower Band Edge Measurement****Upper Band Edge Measurement**

Transmitter Band Edge Radiated Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A253	Antenna	Flann Microwave	12240-20	128	04 Nov 2013	12
A1396	Attenuator	Huber & Suhner	6810.17.B	757987	10 May 2014	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	04 Nov 2013	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	04 Nov 2013	12
M1124	Test Receiver	Rohde & Schwarz	ESIB 26	100046K	14 Aug 2013	12
M1656	Thermometer / Hygrometer station	JM Handelspunkt	30.5015.13	Not stated	24 May 2014	12

6. Measurement Uncertainty

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

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

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

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

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
Maximum Conducted Output Power	5.15 GHz to 5.725 GHz	95%	±1.13 dB
Peak Power Spectral Density	5.15 GHz to 5.725 GHz	95%	±1.13 dB
Peak Excursion	5.15 GHz to 5.725 GHz	95%	±1.13 dB
26 dB Emission Bandwidth	5.15 GHz to 5.725 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 1 GHz	95%	±5.65 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

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

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version