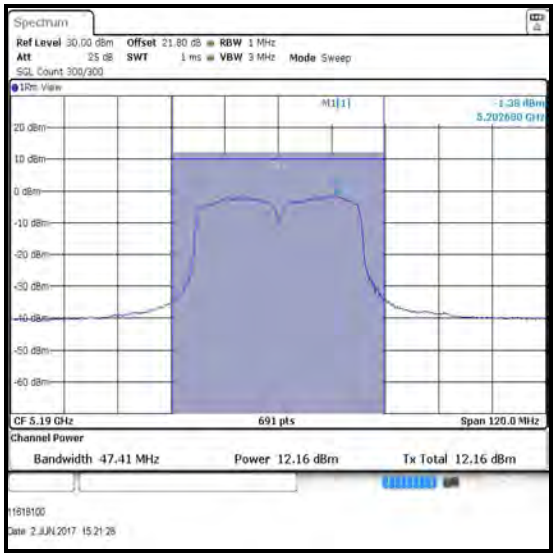
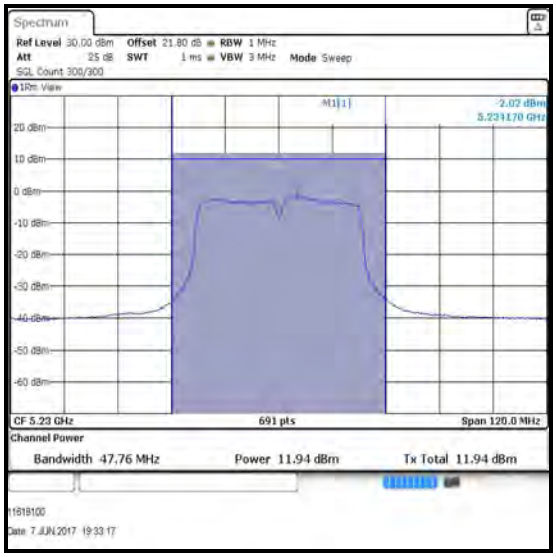
Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS4 / Port Wi-Fi 1

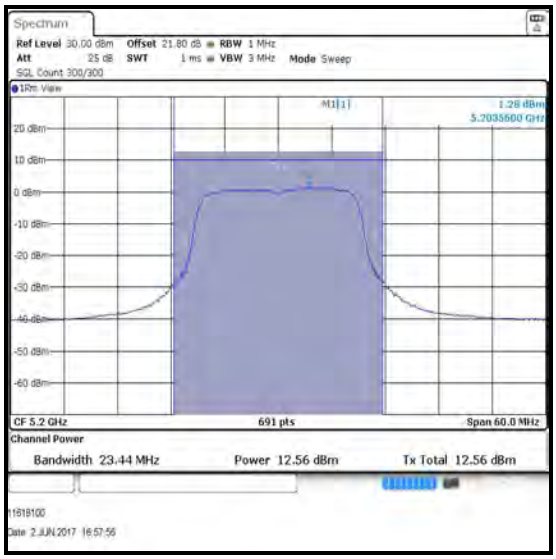


Bottom Channel

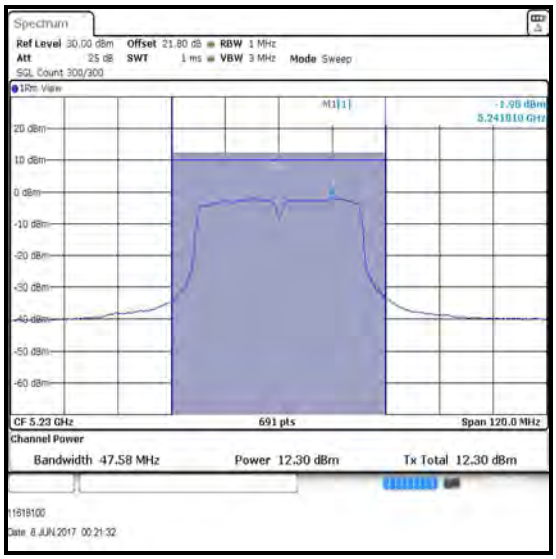


Top Channel

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS4 / Port Wi-Fi 2



Bottom Channel



Top Channel

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2001	Thermohygrometer	Testo	608-H1	45041824	22 Feb 2018	12
M1883	Signal Analyser	Rohde & Schwarz	FSV-30	103084	02 May 2018	12
M1996	Signal Analyser	Rohde & Schwarz	FSV-13	100975	22 Nov 2017	12
M260	Signal Generator	Rohde & Schwarz	SMP 02	829076/008	11 Apr 2018	12
A2919	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	-
A2920	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#3	Calibrated before use	-
A2555	50Ω Termination	Micronde	R404610	Not marked or stated	Calibrated before use	-

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

Test Summary:

Test Engineer:	Philip Harrison	**Test Dates:**	02 June 2017 to 11 July 2017
Test Sample Serial Number:	04423851816340100265		

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

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	45 to 58

Note(s):

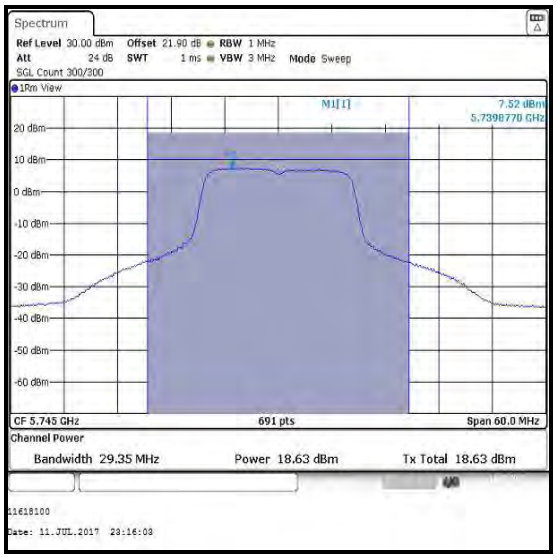
1. Where the duty cycle is <98%, the measurements were performed in accordance with FCC KDB 789033 II.E.2.d) Method SA-2.
2. All supported modes and channel widths were initially investigated on one channel. The modes that produced the highest power and therefore deemed worst case were:
    - 802.11a SISO – Antenna Wi-Fi 1 / 12 Mbit/s
    - 802.11n HT20 SISO – Antenna Wi-Fi 1 / 19.5 Mbit/s / MCS2
    - 802.11n HT40 SISO – Antenna Wi-Fi 1 / 40.5 Mbit/s / MCS2
    - 802.11a MIMO with CDD – 9 Mbit/s
    - 802.11n HT20 MIMO with CDD – 26 Mbit/s / MCS3
    - 802.11n HT40 MIMO with CDD – 27 Mbit/s / MCS1

    Measurements were then performed in these modes on bottom, middle and top channels in all operating bands.
3. For SISO modes only the port which produced the highest output power has been in the tables below.
4. For MIMO modes both ports are recorded in the tables below. They were additionally then combined using the measure-and-sum method stated in FCC KDB 662911.
5. Both EUT antennas have a gain of 2.0 dBi. Therefore the conducted limit was not reduced since the gain is <6 dBi.

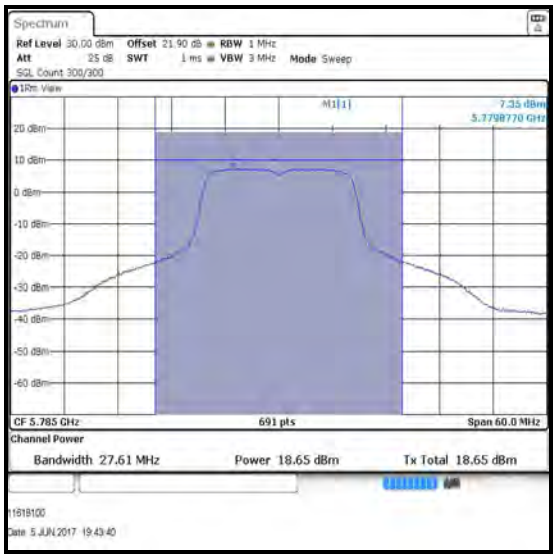
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11a / 20 MHz / SISO / QPSK / 12 Mbit/s / Port Wi-Fi 1

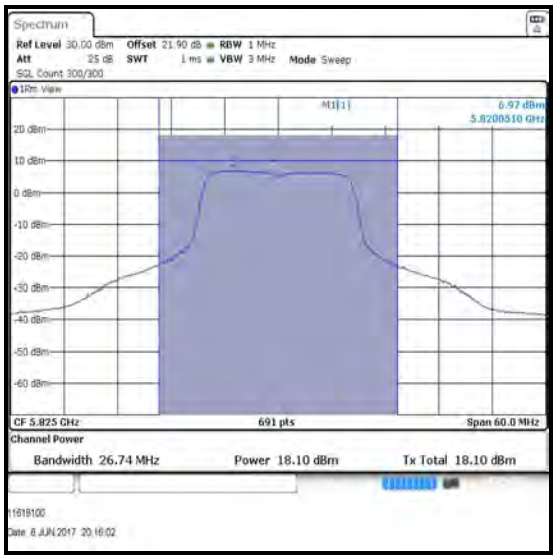
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	18.6	0.2	18.8	30.0	11.2	Complied
Middle	5785	18.7	0.2	18.9	30.0	11.1	Complied
Top	5825	18.1	0.2	18.3	30.0	11.7	Complied



Bottom Channel



Middle Channel

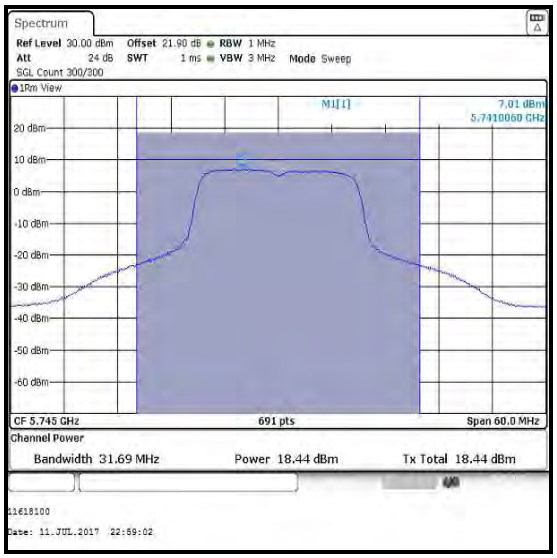


Top Channel

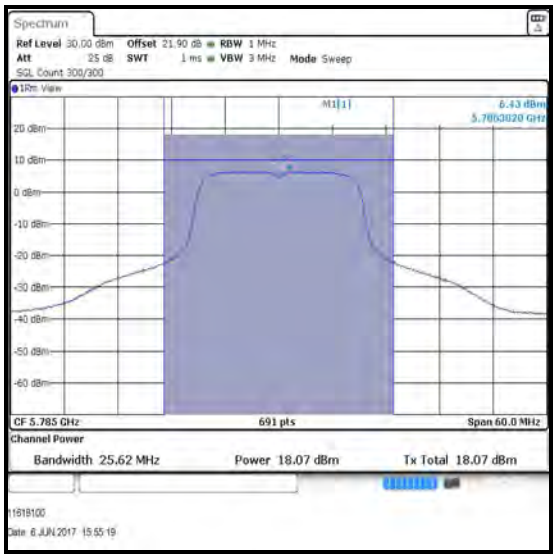
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11n / 20 MHz / SISO / QPSK / MCS2 / Port Wi-Fi 1

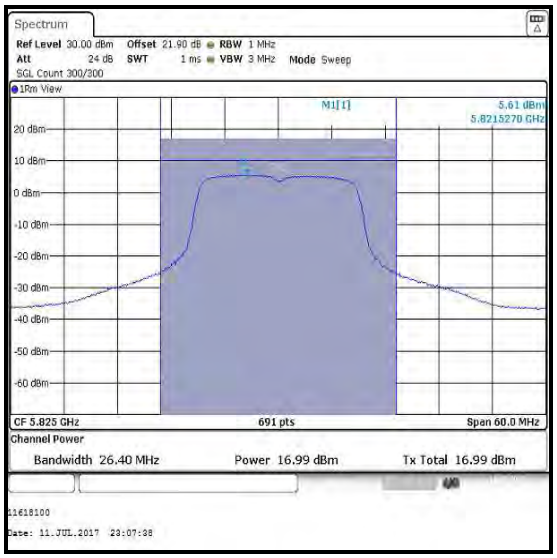
Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	18.4	0.3	18.7	30.0	11.3	Complied
Middle	5785	18.1	0.3	18.4	30.0	11.6	Complied
Top	5825	17.0	0.3	17.3	30.0	12.7	Complied



Bottom Channel



Middle Channel

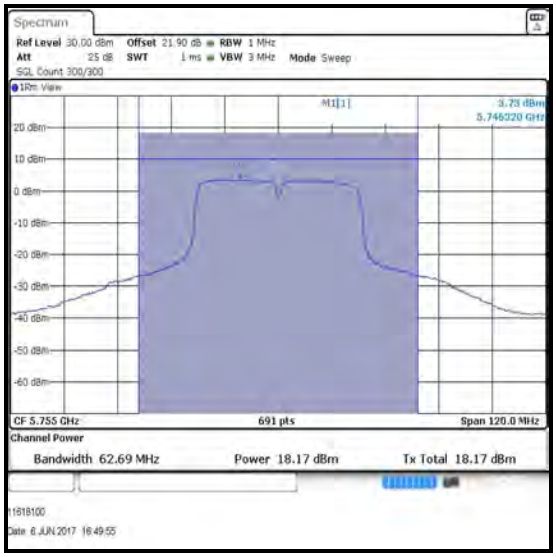


Top Channel

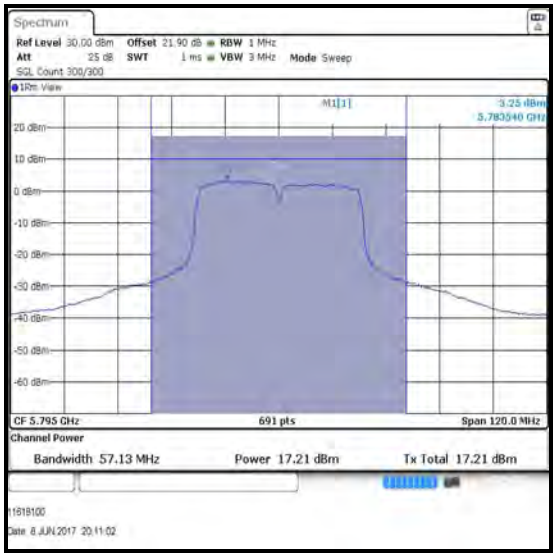
Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / SISO / QPSK / MCS2 / Port Wi-Fi 1

Channel	Frequency (MHz)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5755	18.2	0.4	18.6	30.0	11.4	Complied
Top	5795	17.2	0.4	17.6	30.0	12.4	Complied



Bottom Channel



Top Channel

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

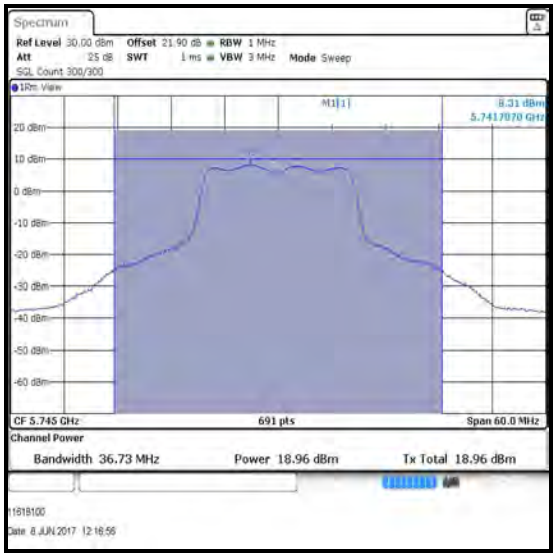
Results: 802.11a / 20 MHz / MIMO / QPSK / 9 Mbit/s

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)
Bottom	5745	19.0	0.2	19.2	19.1	0.2	19.3
Middle	5785	18.5	0.2	18.7	18.4	0.2	18.6
Top	5825	18.3	0.2	18.5	18.2	0.2	18.4

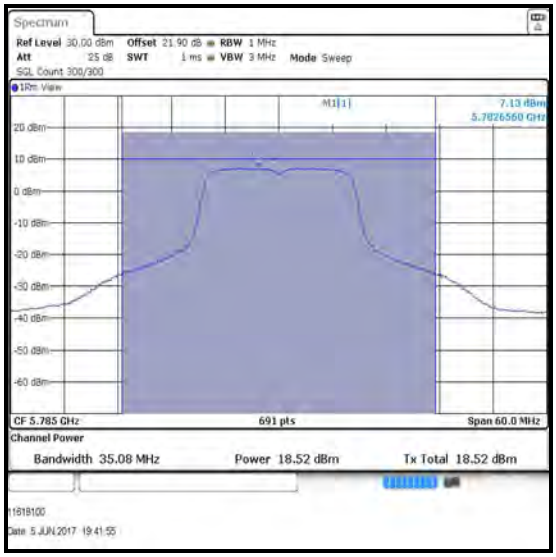
Channel	Frequency (MHz)	Conducted Power Port Wi-Fi 1 (dBm)	Conducted Power Port Wi-Fi 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	19.2	19.3	22.3	30.0	7.7	Complied
Middle	5785	18.7	18.6	21.7	30.0	8.3	Complied
Top	5825	18.5	18.4	21.5	30.0	8.5	Complied

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

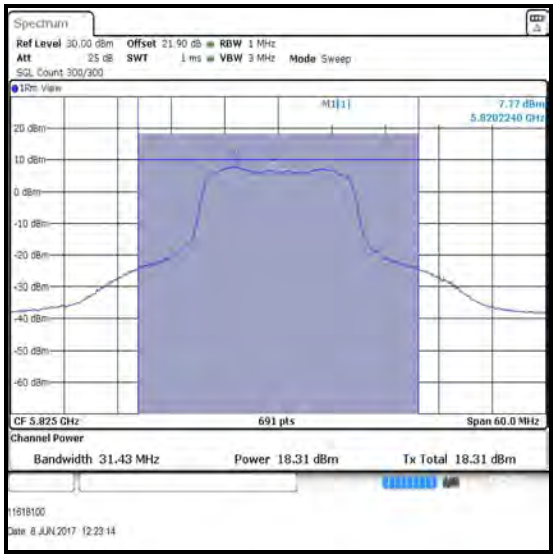
Results: 802.11a / 20 MHz / MIMO / QPSK / 9 Mbit/s / Port Wi-Fi 1



Bottom Channel



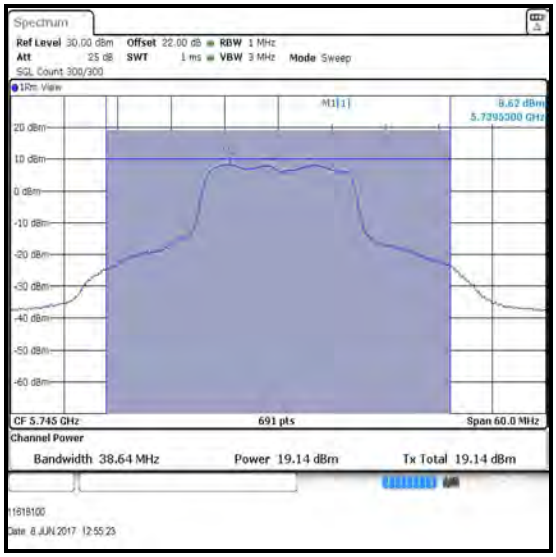
Middle Channel



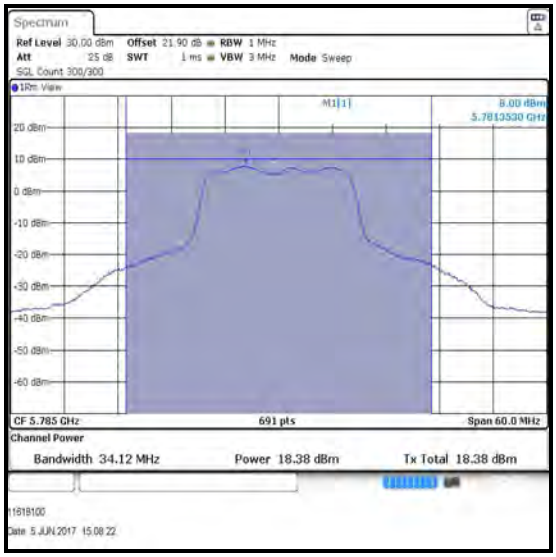
Top Channel

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

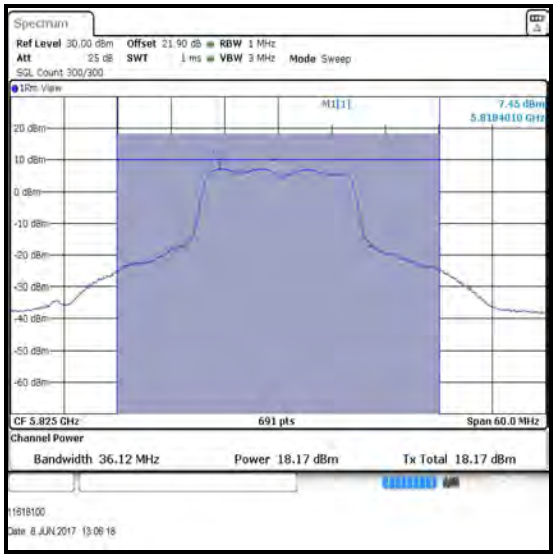
Results: 802.11a / 20 MHz / MIMO / QPSK / 9 Mbit/s / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

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

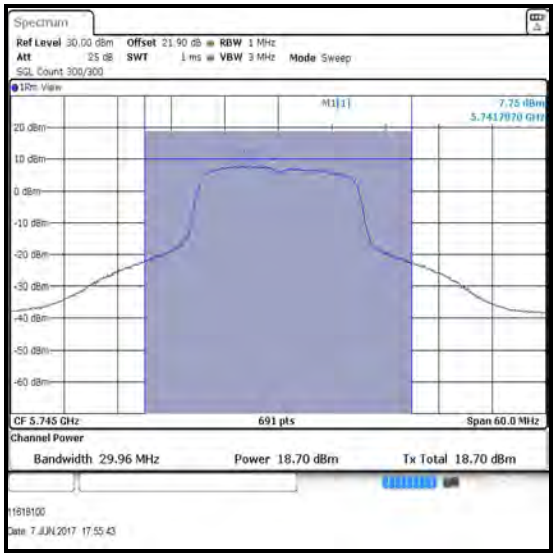
Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)
Bottom	5745	18.7	0.4	19.1	19.1	0.4	19.5
Middle	5785	18.0	0.4	18.4	18.0	0.4	18.4
Top	5825	17.1	0.4	17.5	17.6	0.4	18.0

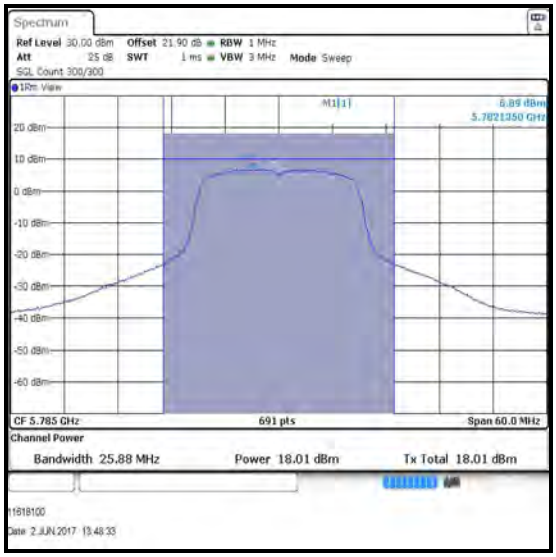
Channel	Frequency (MHz)	Conducted Power Port Wi-Fi 1 (dBm)	Conducted Power Port Wi-Fi 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5745	19.1	19.5	22.3	30.0	7.7	Complied
Middle	5785	18.4	18.4	21.4	30.0	8.6	Complied
Top	5825	17.5	18.0	20.8	30.0	9.2	Complied

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

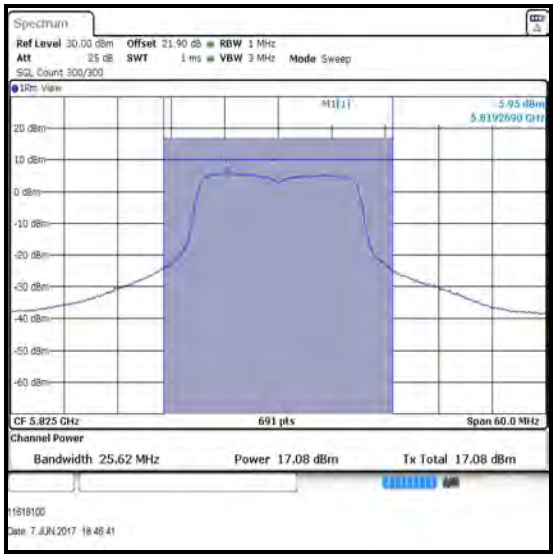
Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 1



Bottom Channel



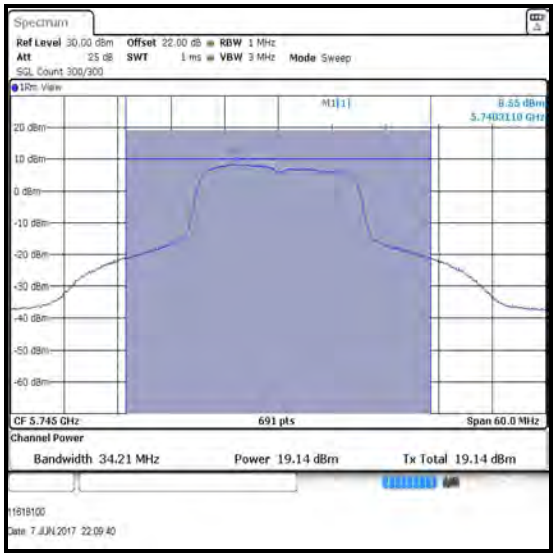
Middle Channel



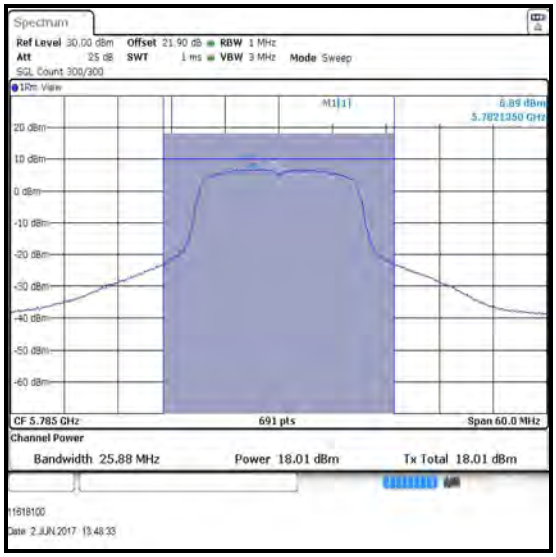
Top Channel

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

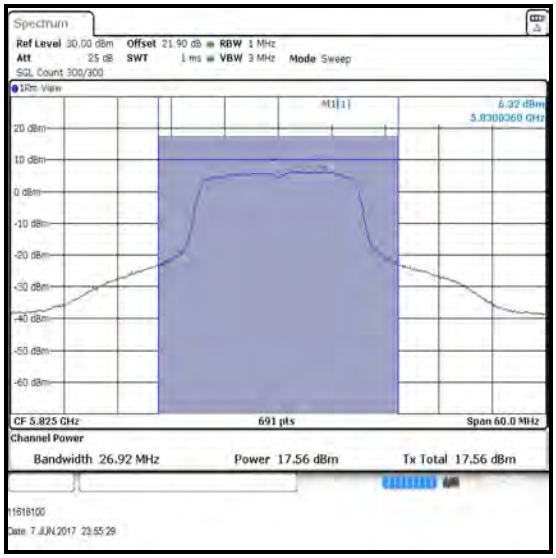
Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

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

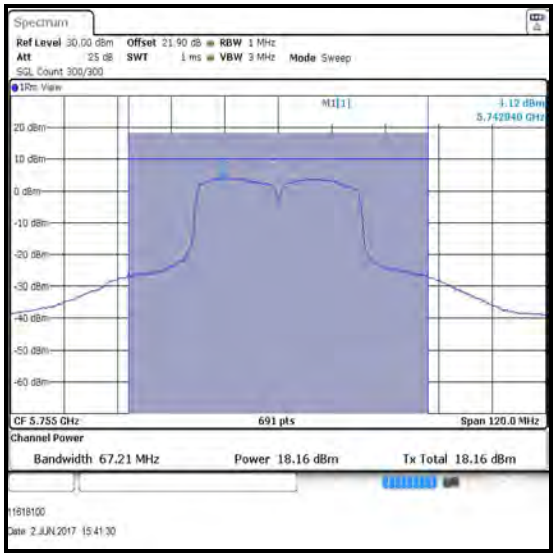
Results: 802.11n / 40 MHz / MIMO / QPSK / MCS1

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)	Conducted Power (dBm)	Duty cycle correction factor (dB)	Corrected Conducted Power (dBm)
Bottom	5755	18.2	0.3	18.5	17.8	0.3	18.1
Top	5795	16.5	0.3	16.8	17.2	0.3	17.5

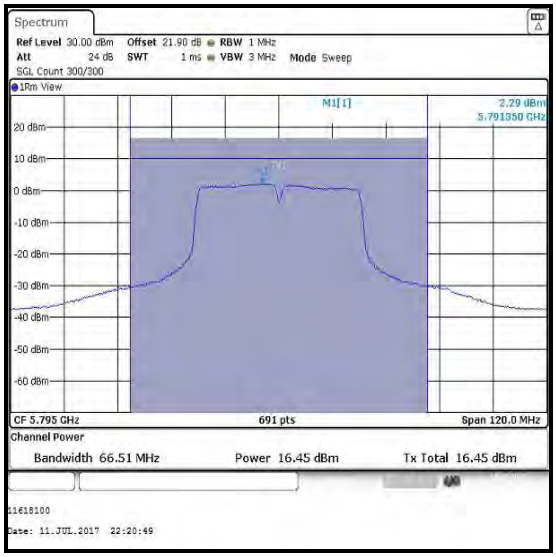
Channel	Frequency (MHz)	Conducted Power Port Wi-Fi 1 (dBm)	Conducted Power Port Wi-Fi 2 (dBm)	Combined Conducted Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	5755	18.5	18.1	21.3	30.0	8.7	Complied
Top	5795	16.8	17.5	20.2	30.0	9.8	Complied

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

Results: 802.11n / 40 MHz / MIMO / QPSK / MCS1 / Port Wi-Fi 1

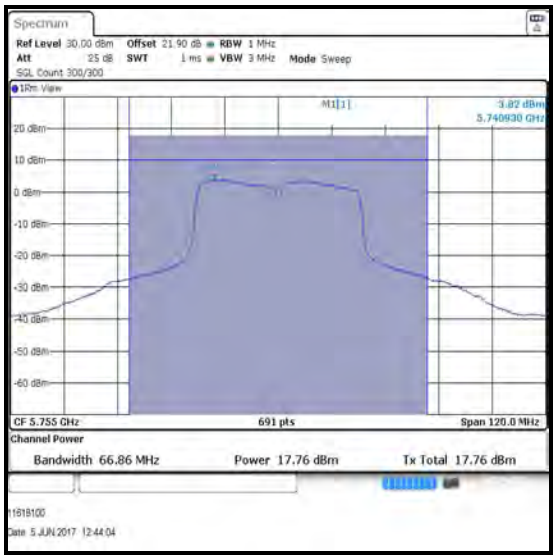


Bottom Channel

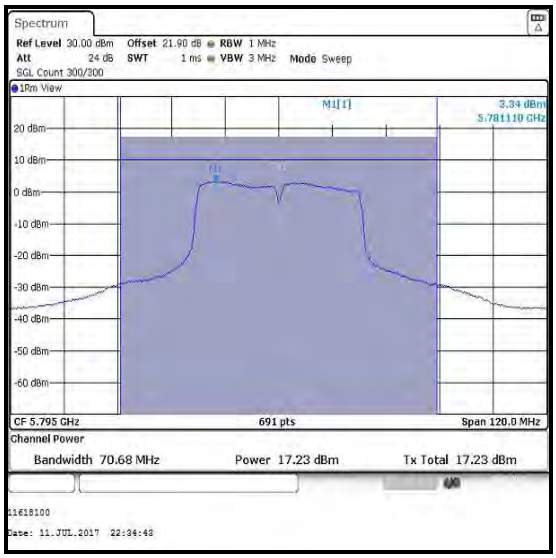


Top Channel

Results: 802.11n / 40 MHz / MIMO / QPSK / MCS1 / Port Wi-Fi 2



Bottom Channel



Top Channel

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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2001	Thermohygrometer	Testo	608-H1	45041824	22 Feb 2018	12
M1883	Signal Analyser	Rohde & Schwarz	FSV-30	103084	02 May 2018	12
M260	Signal Generator	Rohde & Schwarz	SMP 02	829076/008	11 Apr 2018	12
A2919	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	-
A2920	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#3	Calibrated before use	-
A2555	50Ω Termination	Micronde	R404610	Not marked or stated	Calibrated before use	-

5.2.7. Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band)

Test Summary:

Test Engineer:	Philip Harrison	**Test Dates:**	05 June 2017 to 02 August 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Part 15.407(a)(1)(ii)
Test Method Used:	KDB 789033 D02 Section II.F. referencing II.E.2.d)

Environmental Conditions:

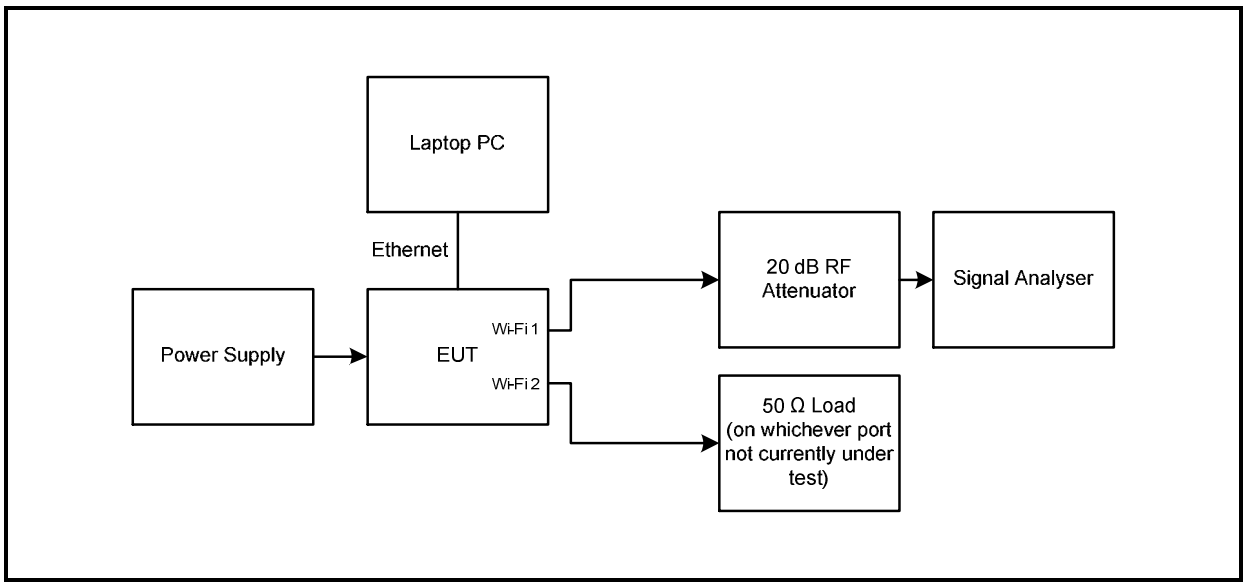
Temperature (°C):	20 to 24
Relative Humidity (%):	45 to 58

Note(s):

1. Transmitter Maximum Power Spectral Density tests were performed using a signal analyser in accordance with KDB 789033 II. F referencing II.E.2.d) Method SA-2.
2. All supported modes and channel widths were initially investigated on the middle channel of the band. The modes that produced the highest spectral density and therefore deemed worst case for all channels were:
   - 802.11a SISO – Antenna Wi-Fi 2 / 6 Mbit/s
   - 802.11n HT20 SISO – Antenna Wi-Fi 1 / 6.5 Mbit/s / MCS0
   - 802.11n HT40 SISO – Antenna Wi-Fi 2 / 40.5 Mbit/s / MCS2
   - 802.11a MIMO with CDD – 48 Mbit/s
   - 802.11n HT20 MIMO with CDD – 26 Mbit/s / MCS3
   - 802.11n HT40 MIMO with CDD – 81 Mbit/s / MCS4
3. Measurements were then performed in these modes on bottom, middle and top channels.
4. For MIMO modes conducted power spectral density was measured on both ports and then combined using the measure-and-sum method stated in FCC KDB 662911.
5. Both EUT antennas have a gain of 2.0 dBi. Therefore the SISO conducted limit was not reduced since the gain is <6 dBi.
6. For the worst-case MIMO modes reported in the tables below, the data stream is correlated as it is single stream with CDD. The directional antenna gain therefore has an additional array gain component of 3.0 dB, in accordance with KDB 662911 D01 section F) 2) f) i). This was calculated from $10 \log(N_{ANT}/N_{SS})$, where the EUT has 2 antennas and one spatial stream. Since this total directional gain is 5.0 dB the MIMO conducted limit was not reduced since the MIMO gain is <6 dBi.
7. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.

Transmitter Maximum Power Spectral Density (continued)

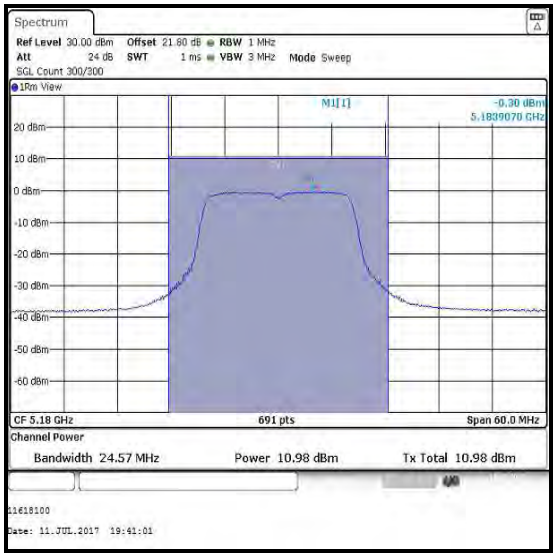
Test setup:



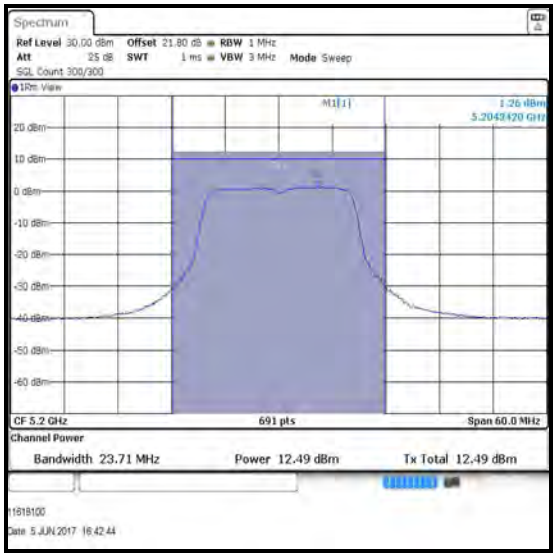
Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

Results: 802.11a / 20 MHz / SISO / BPSK / 6 Mbit/s / Port Wi-Fi 2

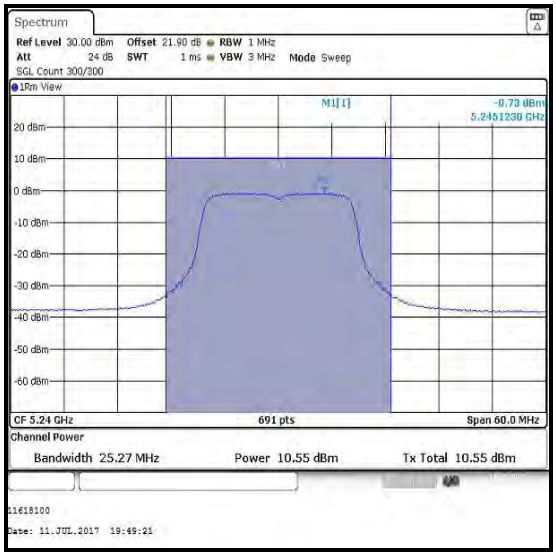
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	-0.3	0.1	-0.2	17.0	17.2	Complied
Middle	5200	1.3	0.1	1.4	17.0	15.6	Complied
Top	5240	-0.7	0.1	-0.6	17.0	17.6	Complied



Bottom Channel



Middle Channel

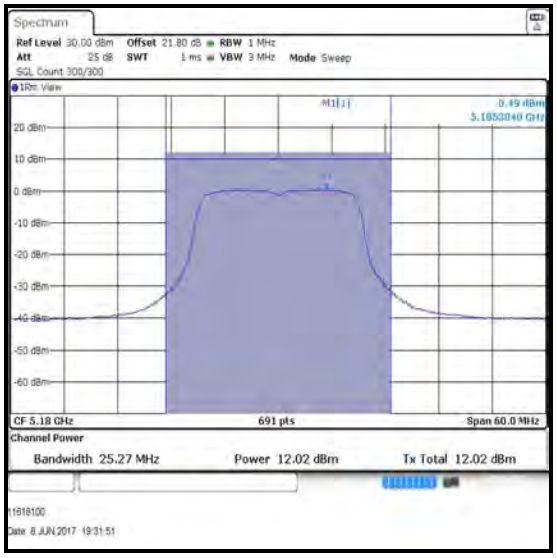


Top Channel

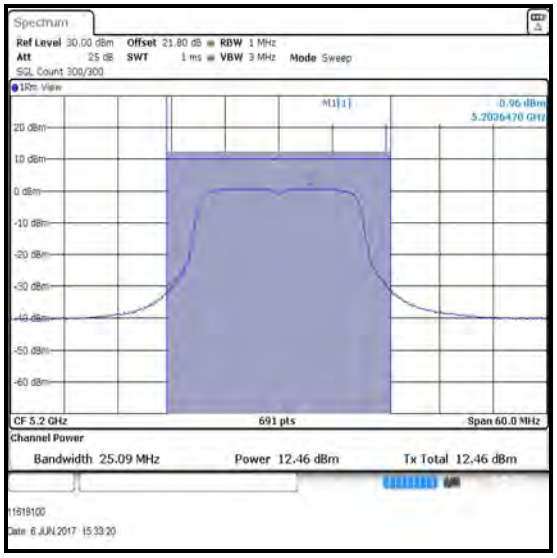
Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

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

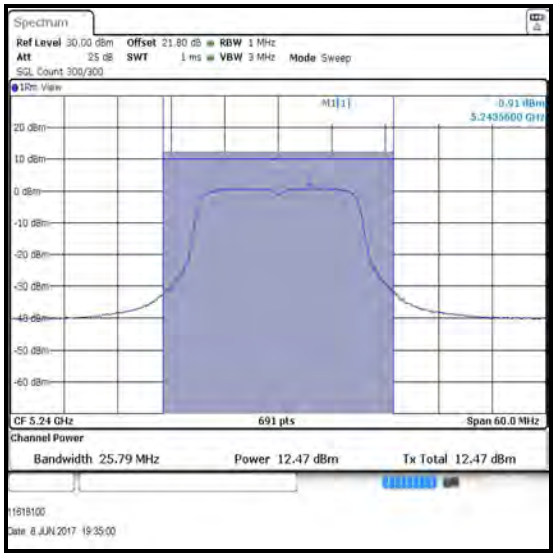
Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5180	0.5	0.1	0.6	17.0	16.4	Complied
Middle	5200	1.0	0.1	1.1	17.0	15.9	Complied
Top	5240	0.9	0.1	1.0	17.0	16.0	Complied



Bottom Channel



Middle Channel

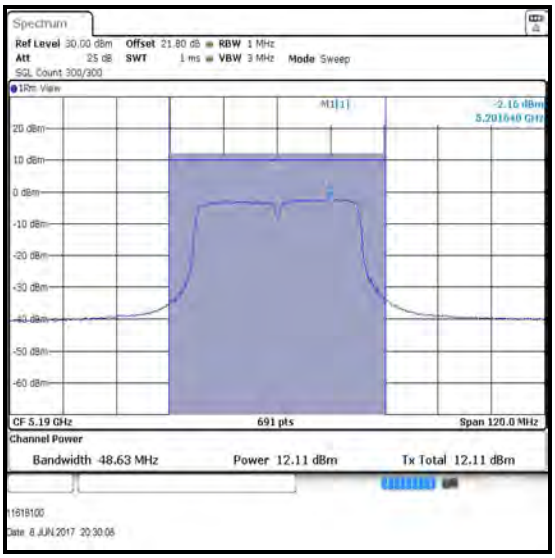


Top Channel

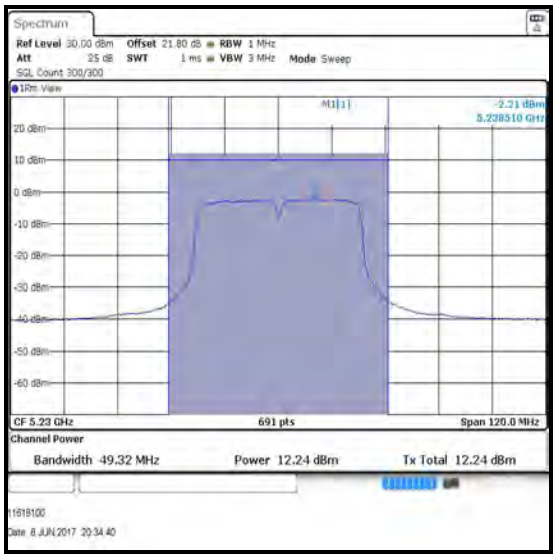
Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / SISO / QPSK / MCS2 / Port Wi-Fi 2

Channel	Frequency (MHz)	PPSD (dBm /MHz)	Duty cycle correction	Corrected PPSD (dBm /MHz)	Limit (dBm /MHz)	Margin (dB)	Result
Bottom	5190	-2.2	0.4	-1.8	17.0	18.8	Complied
Top	5230	-2.2	0.4	-1.8	17.0	18.8	Complied



Bottom Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

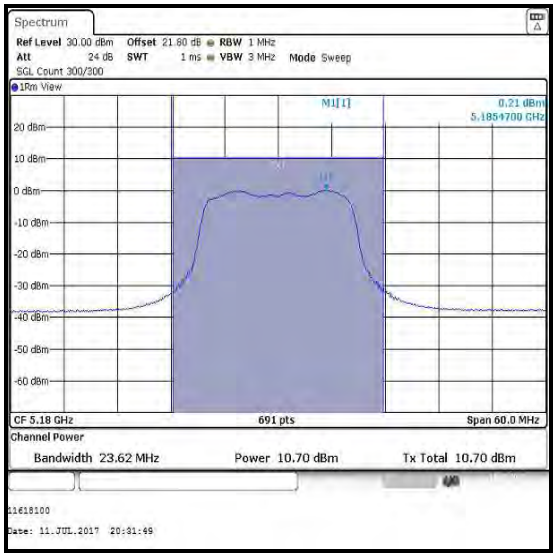
Results: 802.11a / 20 MHz / MIMO / 64-QAM / 48 Mbit/s

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5180	0.2	0.7	0.9	0.3	0.7	1.0
Middle	5200	1.0	0.7	1.7	0.5	0.7	1.2
Top	5240	0.2	0.7	0.9	-0.5	0.7	0.2

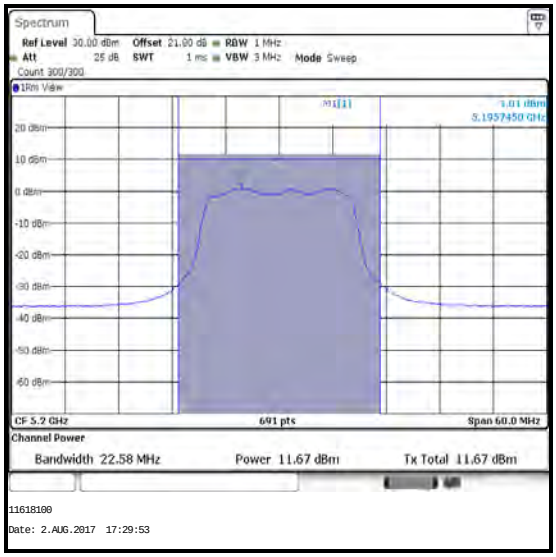
Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm/MHz)	PPSD Port Wi-Fi 2 (dBm/MHz)	Combined PPSD (dBm/MHz)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	0.9	1.0	4.0	17.0	13.0	Complied
Middle	5200	1.7	1.2	4.5	17.0	12.5	Complied
Top	5240	0.9	0.2	3.6	17.0	13.4	Complied

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

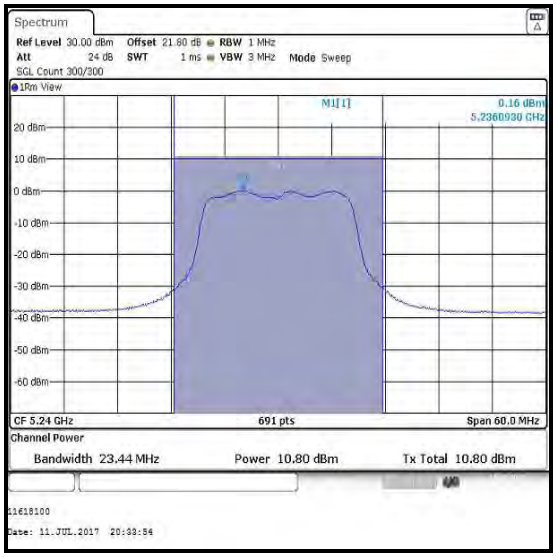
Results: 802.11a / 20 MHz / MIMO / 64-QAM / 48 Mbit/s / Port Wi-Fi 1



Bottom Channel



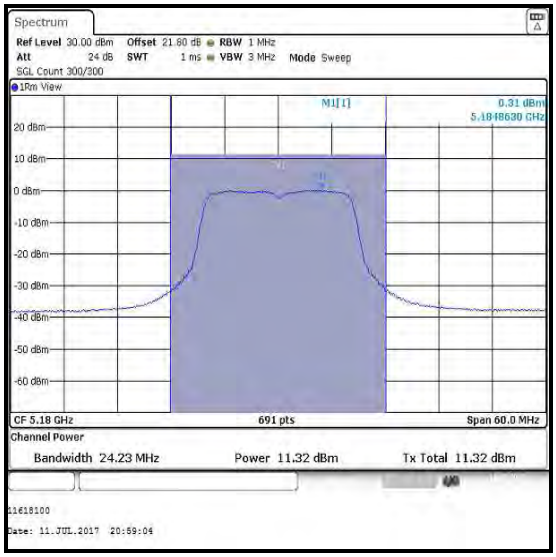
Middle Channel



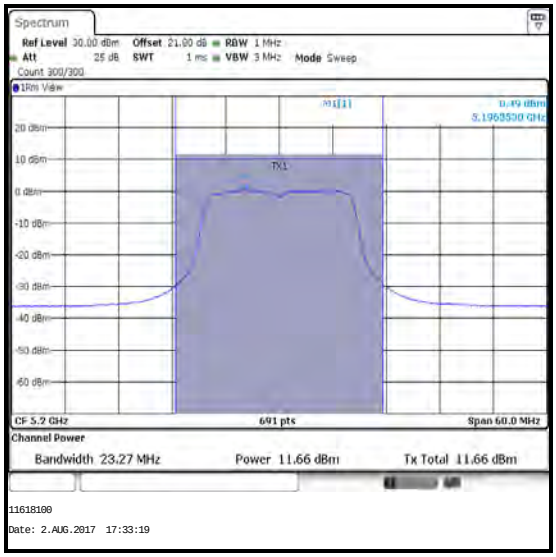
Top Channel

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

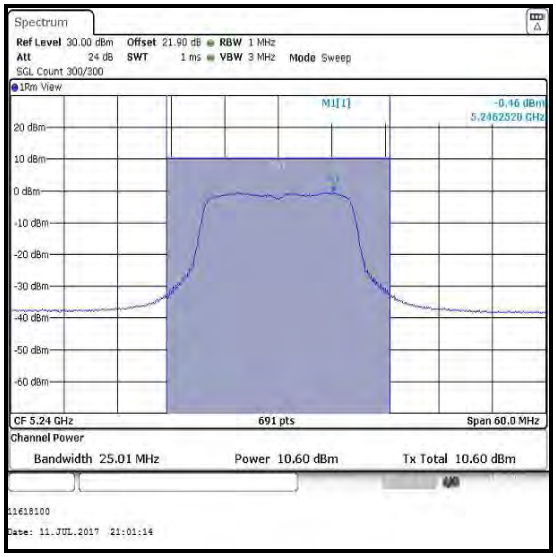
Results: 802.11a / 20 MHz / MIMO / 64-QAM / 48 Mbit/s / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

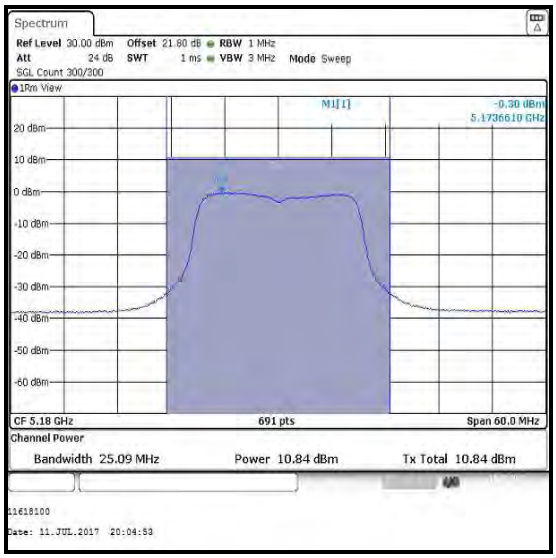
Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3

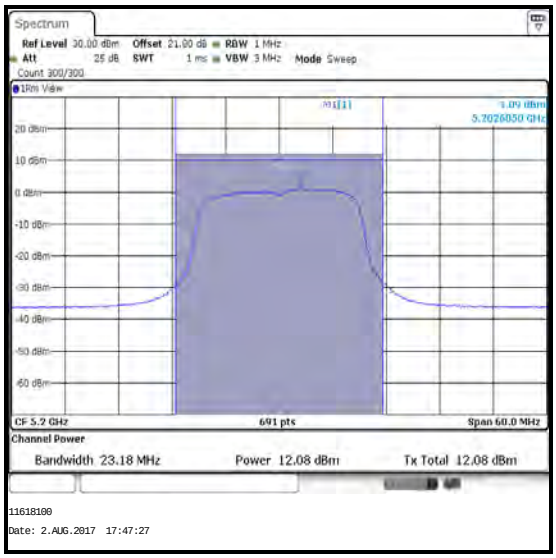
Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5180	-0.3	0.4	0.1	1.1	0.4	1.5
Middle	5200	1.1	0.4	1.5	0.4	0.4	0.8
Top	5240	0.3	0.4	0.7	0.8	0.4	1.2

Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm/MHz)	PPSD Port Wi-Fi 2 (dBm/MHz)	Combined PPSD (dBm/MHz)	Limit (dBm)	Margin (dB)	Result
Bottom	5180	0.1	1.5	3.9	17.0	13.1	Complied
Middle	5200	1.5	0.8	4.2	17.0	12.8	Complied
Top	5240	0.7	1.2	4.0	17.0	13.0	Complied

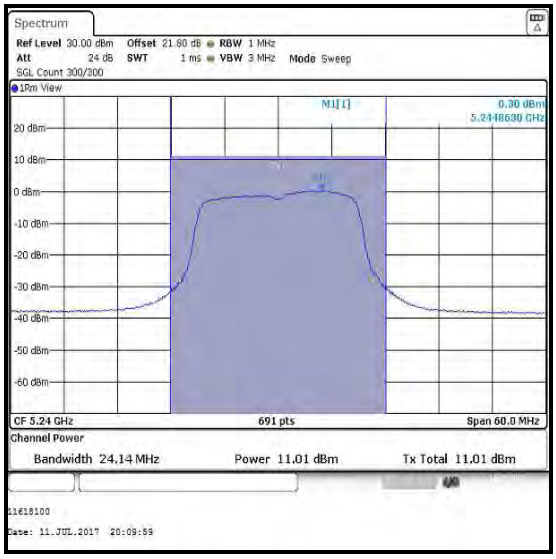
Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 1



Bottom Channel



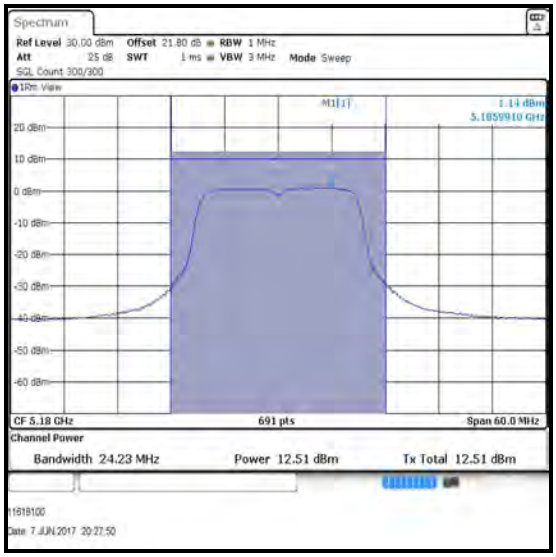
Middle Channel



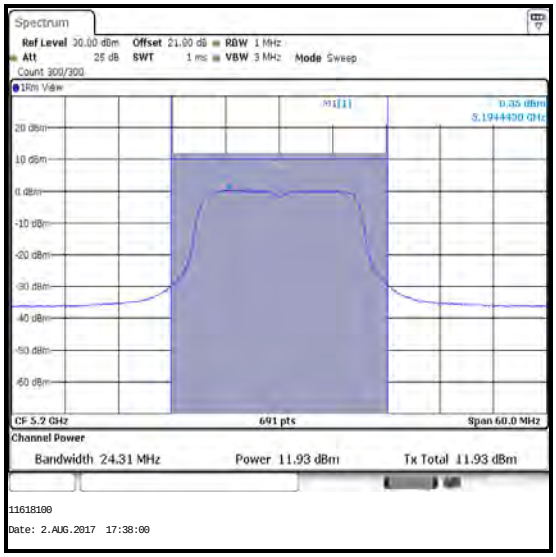
Top Channel

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

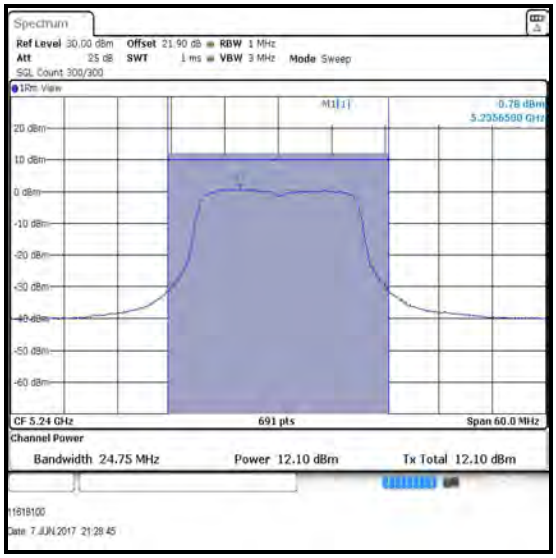
Results: 802.11n / 20 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

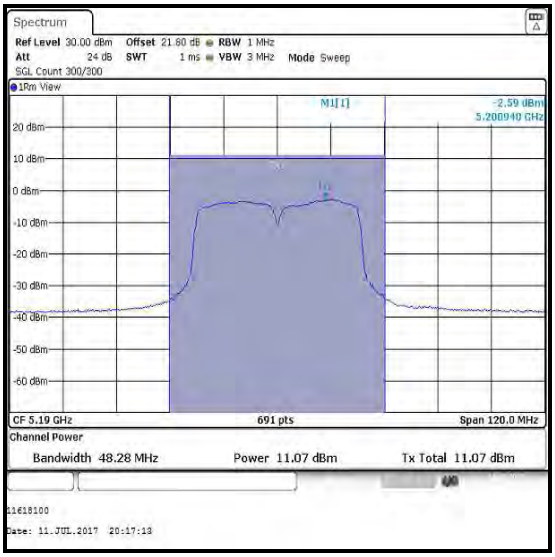
Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS4

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5190	-2.6	0.7	-1.9	-3.0	0.7	-2.3
Top	5230	-3.3	0.6	-2.7	-3.6	0.7	-2.9

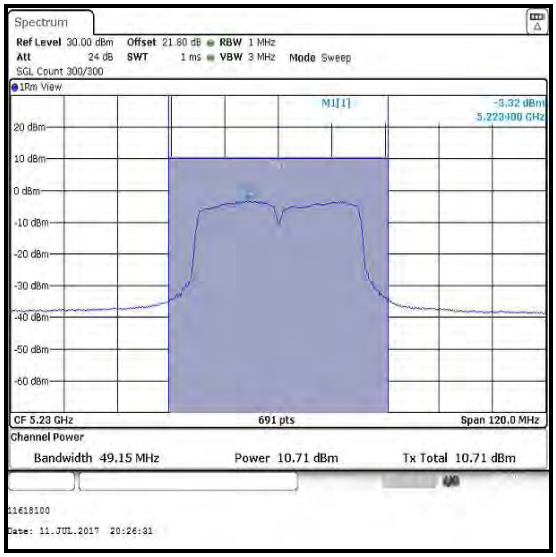
Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm/MHz)	PPSD Port Wi-Fi 2 (dBm/MHz)	Combined PPSD (dBm/MHz)	Limit (dBm)	Margin (dB)	Result
Bottom	5190	-1.9	-2.3	0.9	17.0	16.1	Complied
Top	5230	-2.7	-2.9	0.3	17.0	16.7	Complied

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS4 / Port Wi-Fi 1

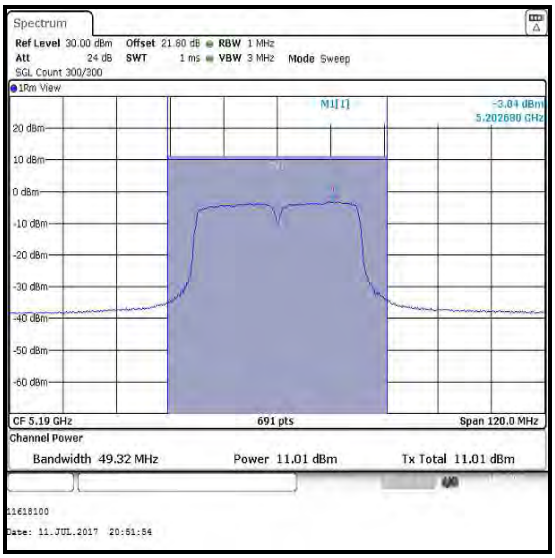


Bottom Channel

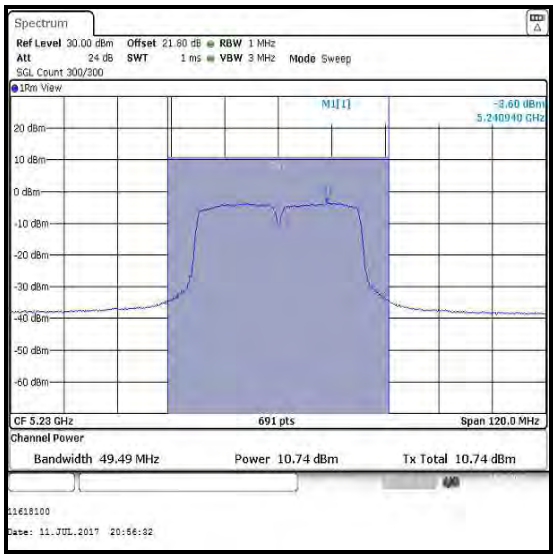


Top Channel

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS4 / Port Wi-Fi 2



Bottom Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.15-5.25 GHz band) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2001	Thermohygrometer	Testo	608-H1	45041824	22 Feb 2018	12
M1883	Signal Analyser	Rohde & Schwarz	FSV-30	103084	02 May 2018	12
M260	Signal Generator	Rohde & Schwarz	SMP 02	829076/008	11 Apr 2018	12
A2919	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	-
A2920	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#3	Calibrated before use	-
A2555	50Ω Termination	Micronde	R404610	Not Marked or Stated	Calibrated Before Use	-

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band)

Test Summary:

Test Engineer:	Philip Harrison	**Test Dates:**	02 June 2017 to 12 July 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Part 15.407(a)(3)
Test Method Used:	KDB 789033 D02 Section II.F. referencing II.E.2.d)

Environmental Conditions:

Temperature (°C):	20 to 24
Relative Humidity (%):	45 to 58

Note(s):

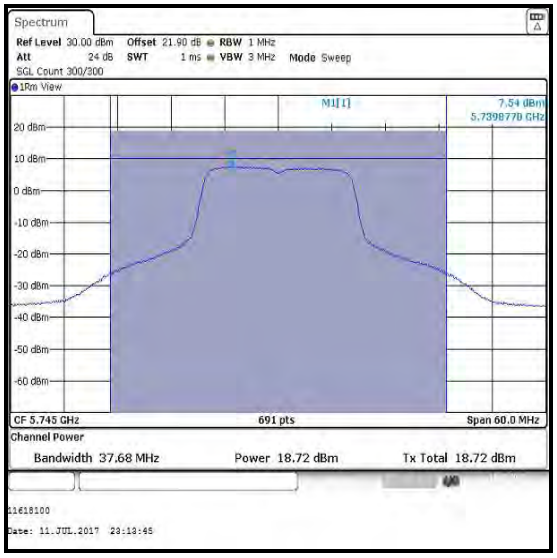
1. Transmitter Maximum Power Spectral Density tests were performed using a signal analyser in accordance with KDB 789033 II. F referencing II.E.2.d) Method SA-2.
2. All supported modes and channel widths were initially investigated on the middle channel of the band. The modes that produced the highest spectral density and therefore deemed worst case for all channels were:
   - o 802.11a - SISO Antenna Wi-Fi 2 / 6 Mbit/s
   - o 802.11n HT20 SISO – Antenna Wi-Fi 1 / 6.5 Mbit/s / MCS0
   - o 802.11n HT40 SISO – Antenna Wi-Fi 2 / 54 Mbit/s / MCS3
   - o 802.11a MIMO with CDD – 9 Mbit/s
   - o 802.11n HT20 MIMO with CDD – 6.5 Mbit/s / MCS0
   - o 802.11n HT40 MIMO with CDD – 54 Mbit/s / MCS3

   Measurements were then performed in these modes on bottom, middle and top channels.
3. FCC Part 15.407(a)(3) limit for PPSD in the 5.725-5.85 GHz operating band is <30 dBm/500 kHz.
4. Both EUT antennas have a gain of 2.0 dBi. Therefore the SISO conducted limit was not reduced since the gain is <6 dBi.
5. For the worst-case MIMO modes reported in the tables below, the data stream is correlated as it is single stream with CDD. The directional antenna gain therefore has an additional array gain component of 3.0 dB, in accordance with KDB 662911 D01 section F) 2) f) i). This was calculated from $10 \log(N_{ANT}/N_{SS})$, where the EUT has 2 antennas and one spatial stream. Since this total directional gain is 5.0 dB the MIMO conducted limit was not reduced since the MIMO gain is <6 dBi.

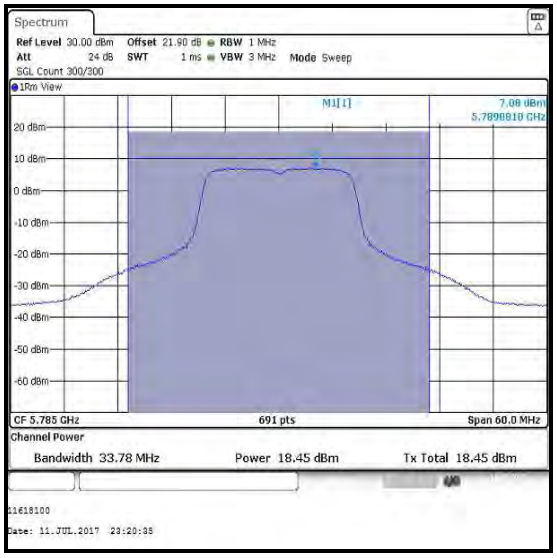
Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

Results: 802.11a / 20 MHz / SISO / BPSK / 6 Mbit/s / Port Wi-Fi 1

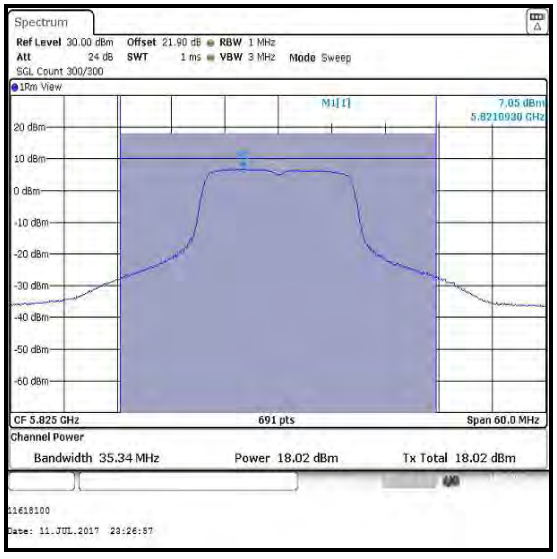
Channel	Frequency (MHz)	PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5745	7.5	0.1	7.6	30.0	22.4	Complied
Middle	5785	7.1	0.1	7.2	30.0	22.8	Complied
Top	5825	7.0	0.1	7.1	30.0	22.9	Complied



Bottom Channel



Middle Channel

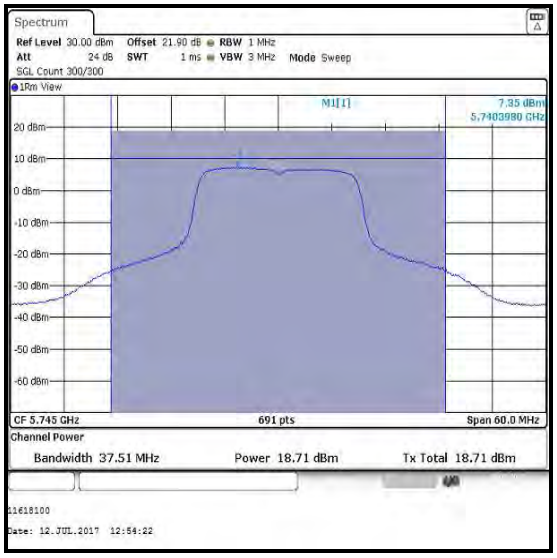


Top Channel

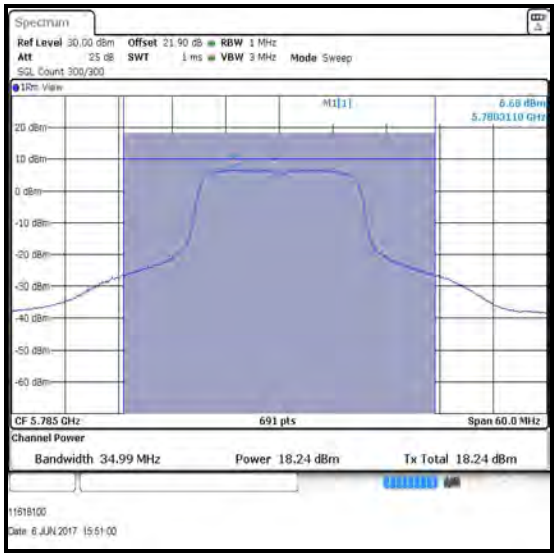
Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

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

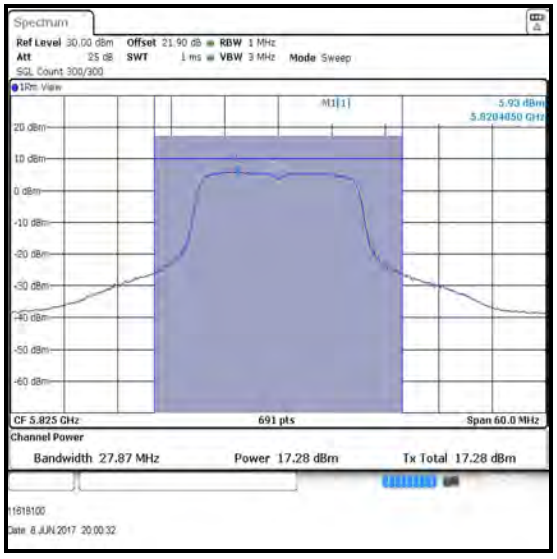
Channel	Frequency (MHz)	PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5745	7.4	0.1	7.5	30.0	22.5	Complied
Middle	5785	6.7	0.1	6.8	30.0	23.2	Complied
Top	5825	5.9	0.1	6.0	30.0	24.0	Complied



Bottom Channel



Middle Channel

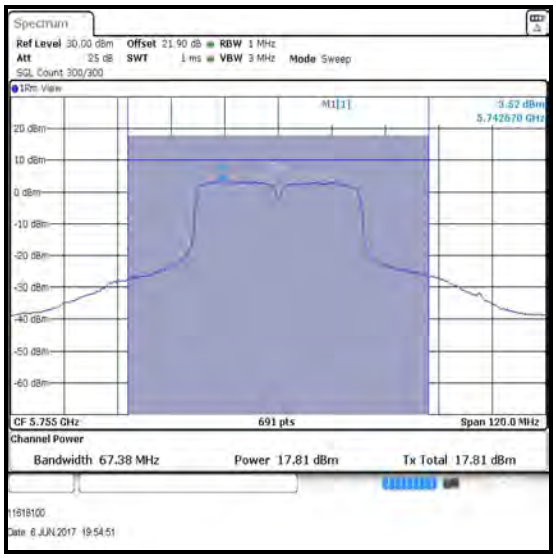


Top Channel

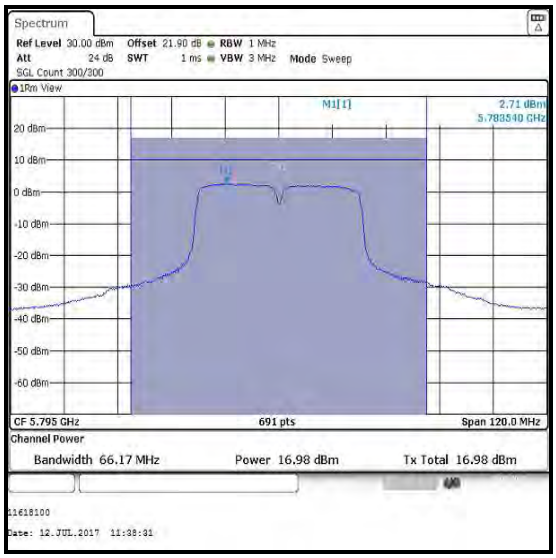
Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / SISO / 16-QAM / MCS3 / Port Wi-Fi 2

Channel	Frequency (MHz)	PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5755	3.5	0.5	4.0	30.0	26.0	Complied
Top	5795	2.7	0.5	3.2	30.0	26.8	Complied



Bottom Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

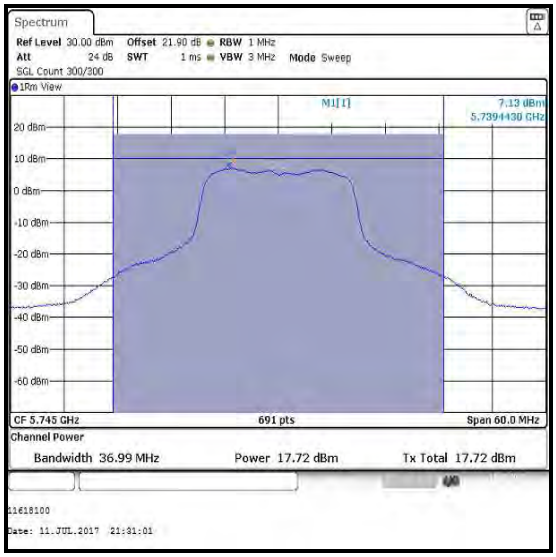
Results: 802.11a / 20 MHz / MIMO / BPSK / 9 Mbit/s

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5745	7.1	0.2	7.3	7.0	0.2	7.2
Middle	5785	8.0	0.2	8.2	8.0	0.2	8.2
Top	5825	6.5	0.2	6.7	6.1	0.2	6.3

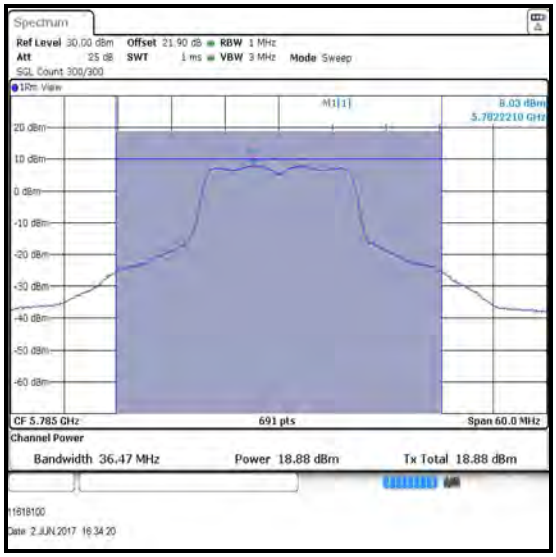
Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm / 1 MHz)	PPSD Port Wi-Fi 2 (dBm / 1 MHz)	Combined PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5745	7.3	7.2	10.3	30.0	19.7	Complied
Middle	5785	8.2	8.2	11.2	30.0	18.8	Complied
Top	5825	6.7	6.3	9.5	30.0	20.5	Complied

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

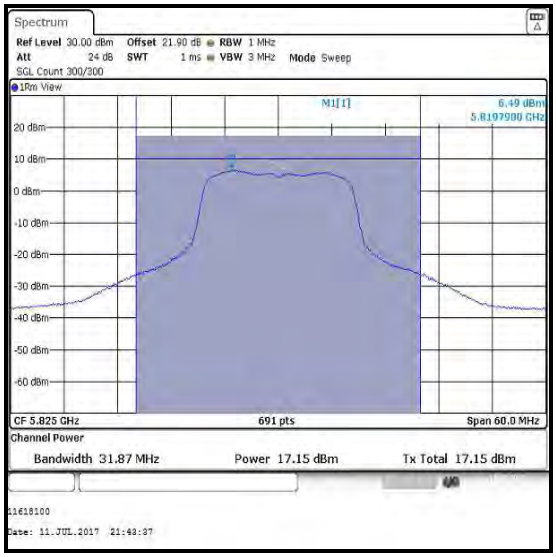
Results: 802.11a / 20 MHz / MIMO / BPSK / 9 Mbit/s / Port Wi-Fi 1



Bottom Channel



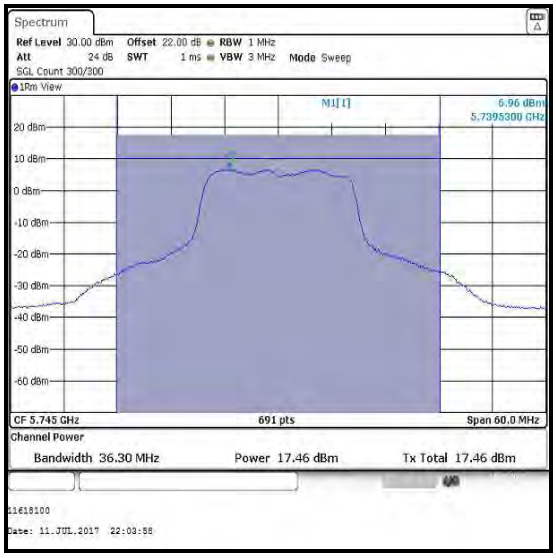
Middle Channel



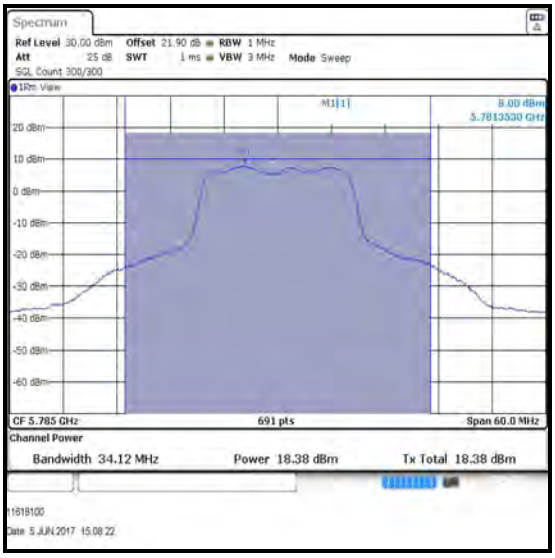
Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

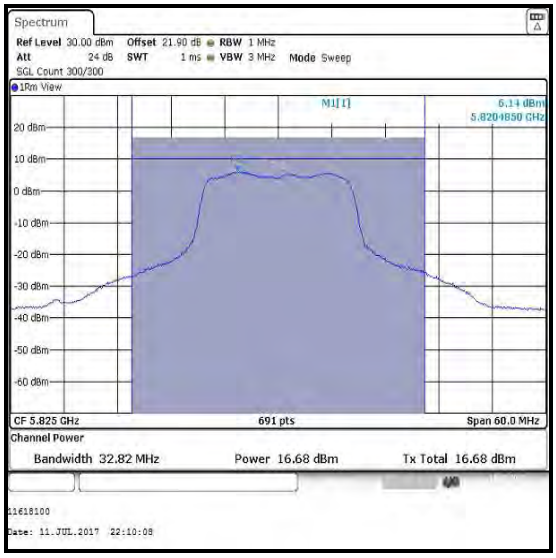
Results: 802.11a / 20 MHz / MIMO / BPSK / 9 Mbit/s / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

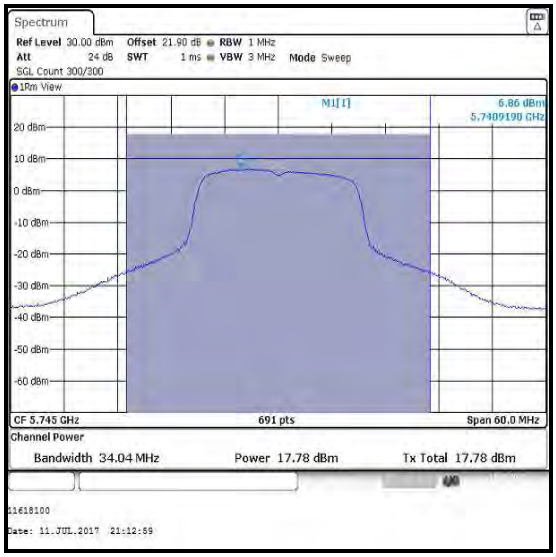
Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5745	6.9	0.1	7.0	6.4	0.1	6.5
Middle	5785	7.4	0.1	7.5	7.8	0.1	7.9
Top	5825	5.1	0.1	5.2	5.1	0.1	5.2

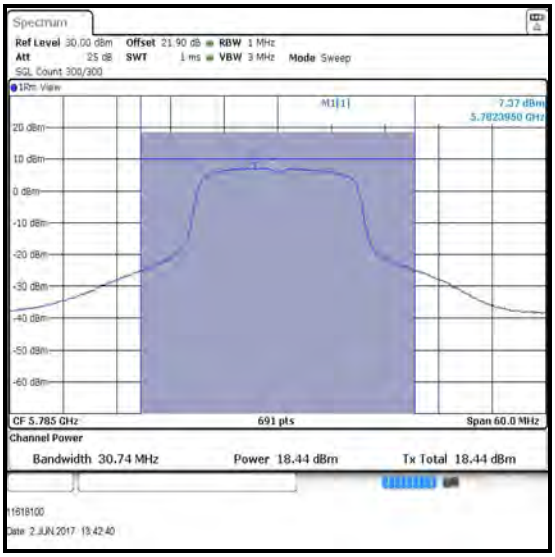
Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm / 1 MHz)	PPSD Port Wi-Fi 2 (dBm / 1 MHz)	Combined PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5745	7.0	6.5	9.8	30.0	20.2	Complied
Middle	5785	7.5	7.9	10.7	30.0	19.3	Complied
Top	5825	5.2	5.2	8.2	30.0	21.8	Complied

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

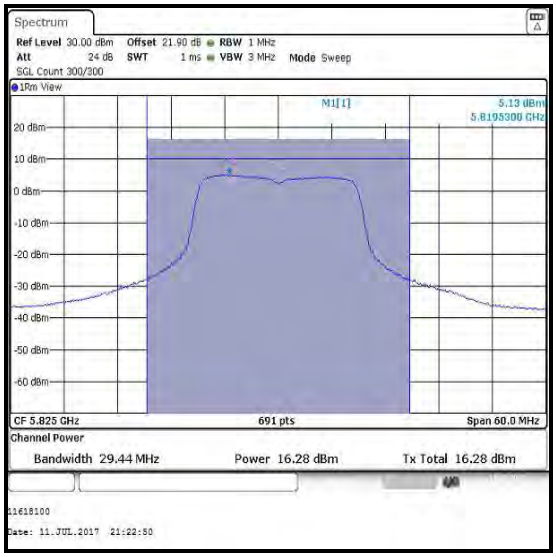
Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Port Wi-Fi 1



Bottom Channel



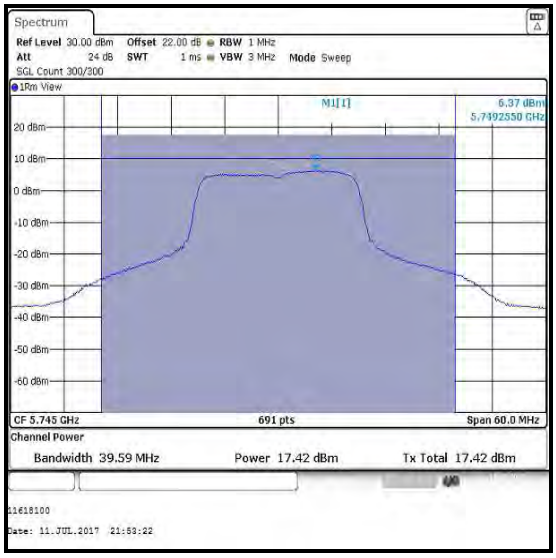
Middle Channel



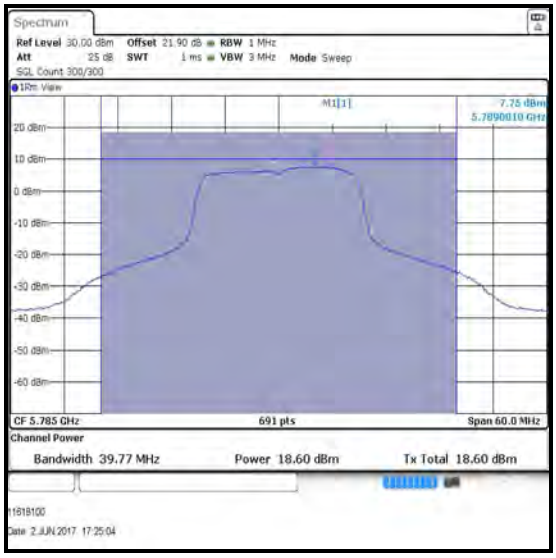
Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

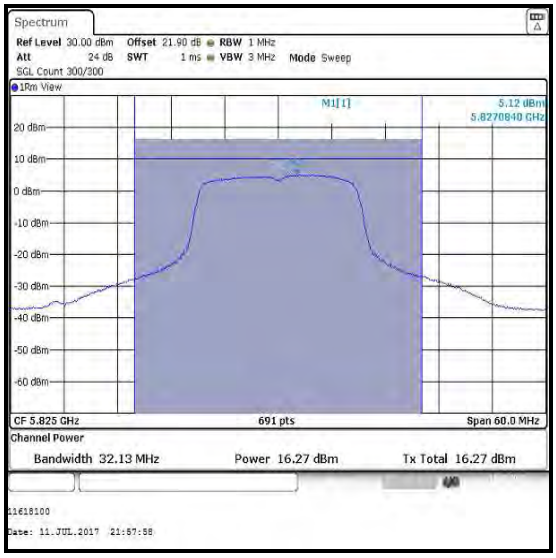
Results: 802.11n / 20 MHz / MIMO / BPSK / MCS0 / Port Wi-Fi 2



Bottom Channel



Middle Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

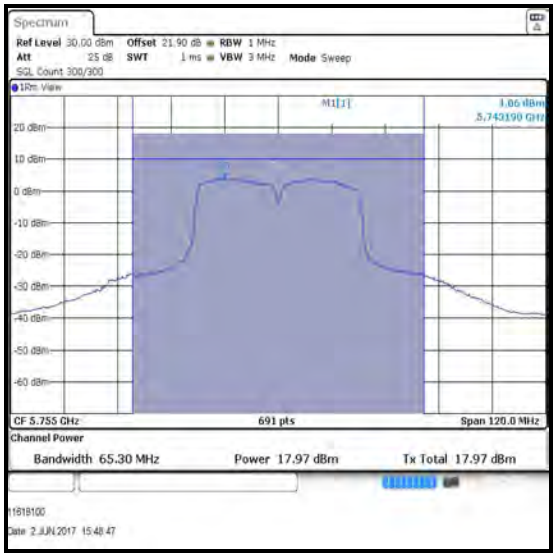
Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS3

Channel	Frequency (MHz)	Port WiFi 1			Port WiFi 2		
		Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)	Conducted PPSD (dBm / 1 MHz)	Duty cycle correction factor (dB)	Corrected Conducted PPSD (dBm / 1 MHz)
Bottom	5755	4.1	0.5	4.6	3.9	0.5	4.4
Top	5795	2.3	0.5	2.8	3.2	0.5	3.7

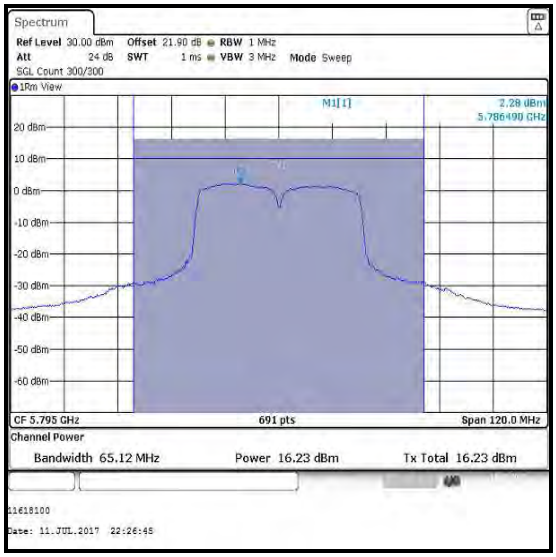
Channel	Frequency (MHz)	PPSD Port Wi-Fi 1 (dBm / 1 MHz)	PPSD Port Wi-Fi 2 (dBm / 1 MHz)	Combined PPSD (dBm / 1 MHz)	Limit (dBm / 500 kHz)	Margin (dB)	Result
Bottom	5755	4.6	4.4	7.5	30.0	22.5	Complied
Top	5795	2.8	3.7	6.3	30.0	23.7	Complied

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 1

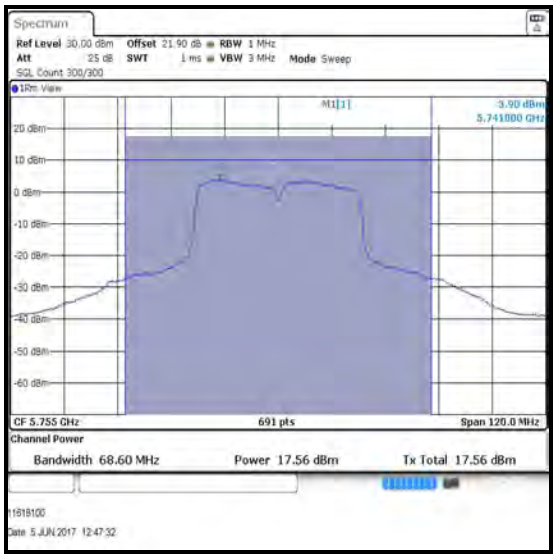


Bottom Channel

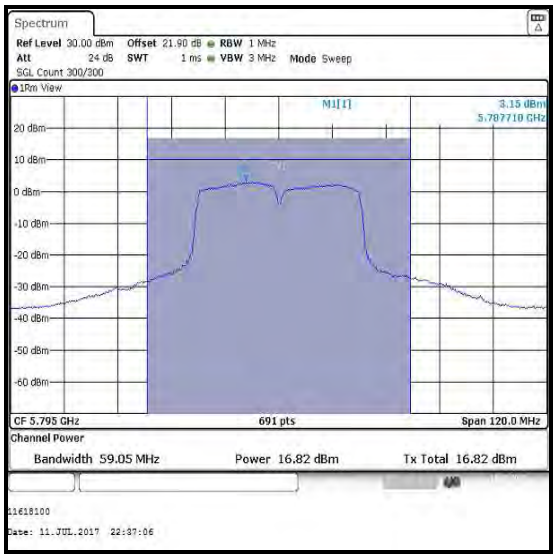


Top Channel

Results: 802.11n / 40 MHz / MIMO / 16-QAM / MCS3 / Port Wi-Fi 2



Bottom Channel



Top Channel

Transmitter Maximum Power Spectral Density (5.725-5.85 GHz band) (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2001	Thermohygrometer	Testo	608-H1	45041824	22 Feb 2018	12
M1883	Signal Analyser	Rohde & Schwarz	FSV-30	103084	02 May 2018	12
M260	Signal Generator	Rohde & Schwarz	SMP 02	829076/008	11 Apr 2018	12
A2919	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#2	Calibrated before use	-
A2920	20 dB Attenuator	AtlanTecRF	AN18W5-20	832828#3	Calibrated before use	-
A2555	50Ω Termination	Micronde	R404610	Not Marked or Stated	Calibrated Before Use	-

5.2.8. Transmitter Out of Band Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	26 June 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Parts 15.407(b)(4),(6),(7) & 15.209(a)
Test Method Used:	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

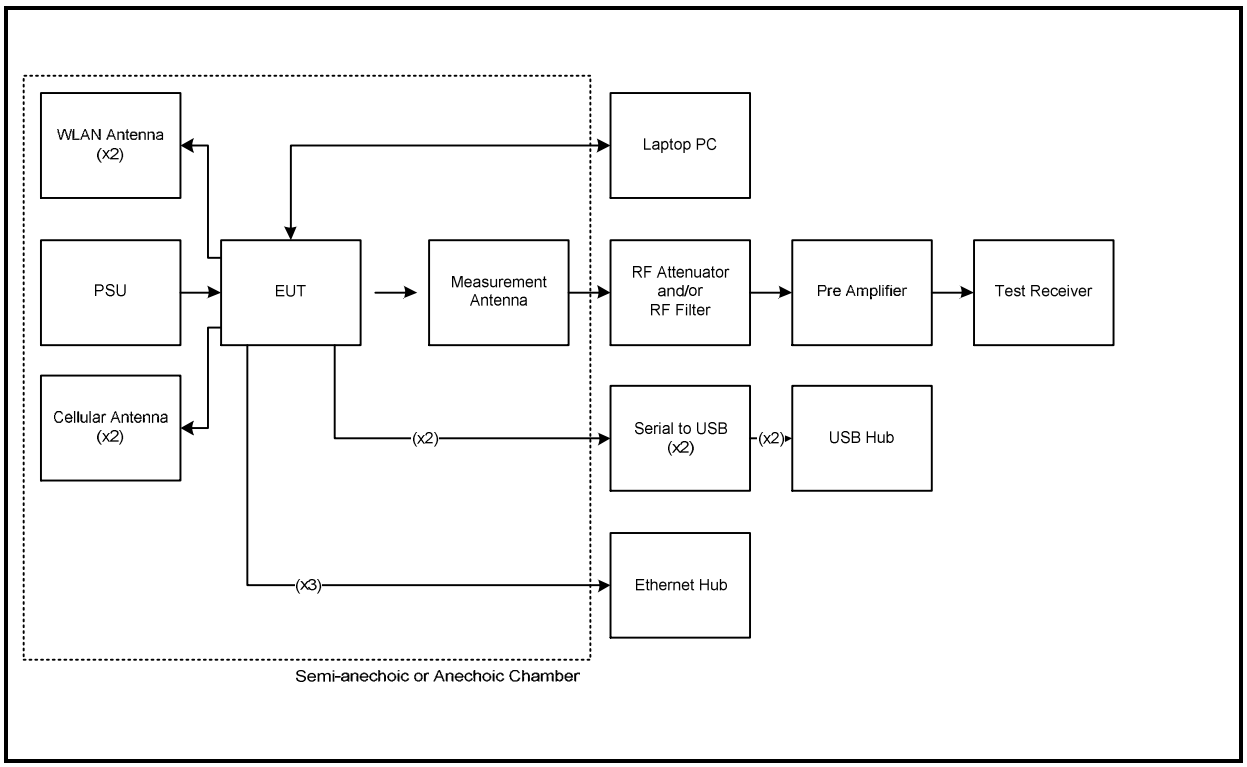
Temperature (°C):	25
Relative Humidity (%):	46

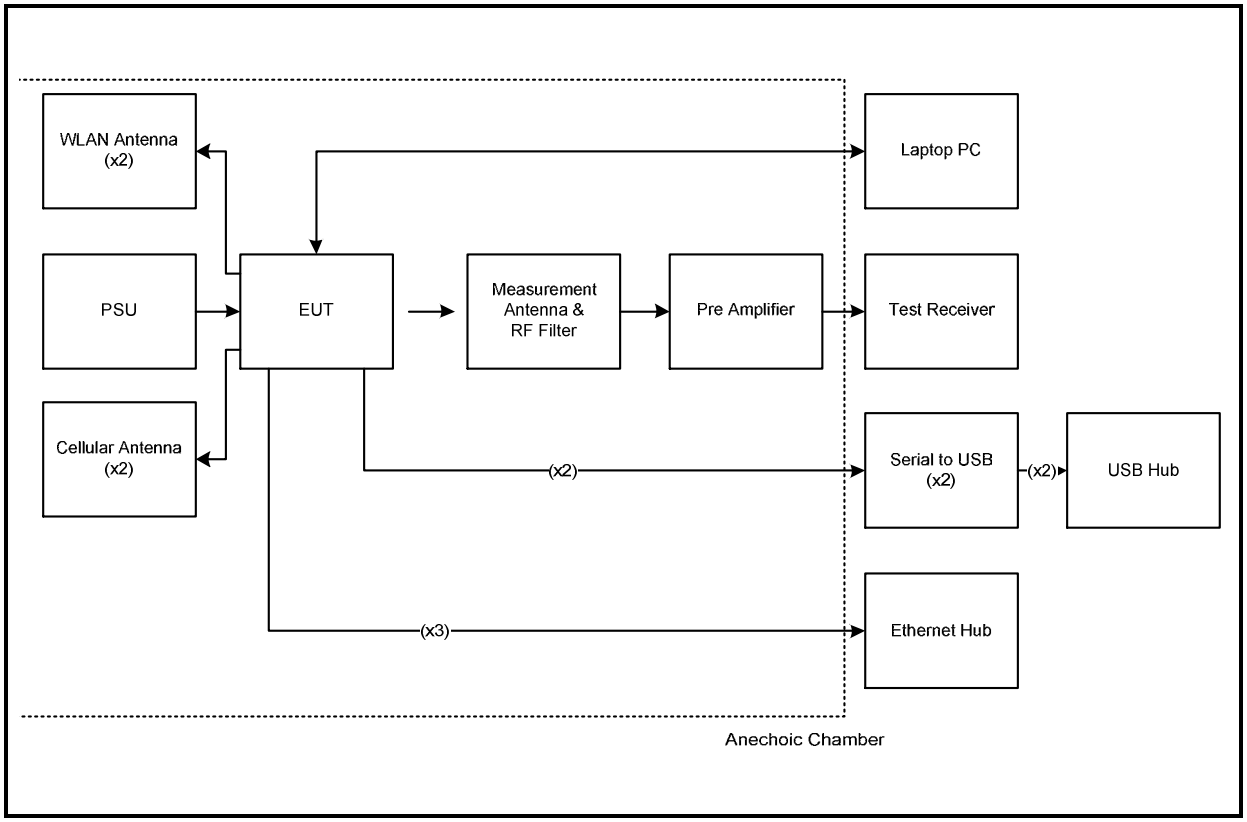
Note(s):

1. Measurements below 1 GHz were limited to the 5.725-5.85 GHz band, the EUT was transmitting with a data rate of 9 Mbit/s / MIMO (802.11a) as it produced the highest conducted output power and was therefore deemed worst case.
2. Pre-scans with the EUT transmitting on the middle channel were measured according to FCC Part 15.407(b)(4)(i) states for transmitters operating in the band 5.725 to 5.85 GHz: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. 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, i.e. 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 middle channel in U-NII band 3 only.
5. All other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
6. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0017) 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 (continued)

Test setup for radiated measurements:

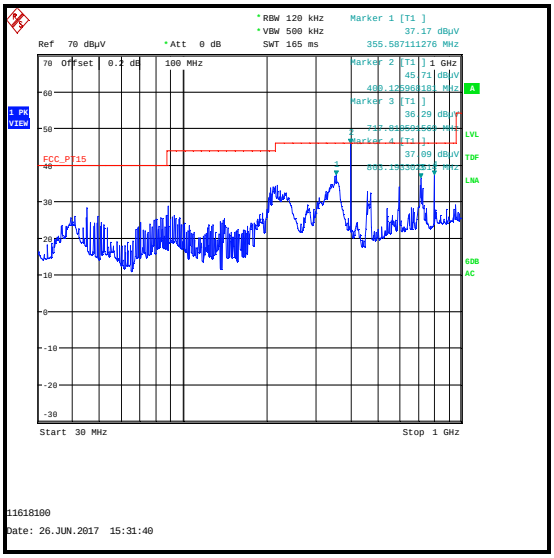




Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)

Results: Middle Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
399.999	Horizontal	45.6	46.0	0.4	Complied



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

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Feb 2018	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Apr 2018	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	13 Apr 2018	12
A2903	Antenna	Schwarzbeck	VULB 9163	9163-944	22 Aug 2017	12
A2971	Low Pass Filter	AtlanTecRF	AFL-02000	15062902845	06 Mar 2018	12

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

Test Summary:

Test Engineer:	Andrew Edwards	**Test Dates:**	22 June 2017 & 23 June 2017
Test Engineer:	04423851816340100265		

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

Environmental Conditions:

Temperature (°C):	26 to 27
Relative Humidity (%):	42 to 44

Note(s):

1. FCC Part 15.407(b)(1) states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the 5.15 to 5.35 GHz band will not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply i.e. restricted bands of operation.
2. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
3. Measured field strength was converted to EIRP in accordance with KDB 789033 G.2.d)(iii) using a conversion factor of 95.2.
4. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the spectrum analyser as RF levels offsets.
5. Pre-scans were performed with the EUT transmitting on middle channel in 5.725 to 5.85 GHz 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 emissions seen in each band.
6. The result tables below show a maximum highest six emissions recorded as required by ANSI C63.10 Section 6.6.4.3. Therefore all other final measurements that are within 20 dB are of the applicable limit stored on the UL VS LTD IT server and available for inspection if required.
7. All other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
8. The emissions seen at approximately 3856 MHz and 7713 MHz on the pre-scan plots were not visible when the EUT was transmitting in the 5.15 GHz to 5.25 GHz band.
9. In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements, data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor calculated in Section 5.2.5 of this report was added to the measured result.
10. All Measurements above 1 GHz were performed in an anechoic chamber (UL VS LTD Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres 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 (5.15-5.25 GHz band operation) (continued)

Results: Bottom Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5519.923	Horizontal	-36.7	-27.0	9.7	Complied
5560.231	Horizontal	-36.2	-27.0	9.2	Complied
5640.015	Horizontal	-35.2	-27.0	8.2	Complied
5759.823	Horizontal	-34.6	-27.0	7.6	Complied
5839.938	Horizontal	-34.9	-27.0	7.9	Complied
5960.115	Horizontal	-36.4	-27.0	9.4	Complied

Results: Bottom Channel / Field Strength / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5439.946	Horizontal	57.3	74.0	16.7	Complied

Results: Bottom Channel / Field Strength / Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
5439.946	Horizontal	47.3	0.2	47.5	54.0	6.5	Complied

Results: Middle Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5520.077	Horizontal	-37.2	-27.0	10.2	Complied
5640.062	Horizontal	-34.9	-27.0	7.9	Complied
5760.015	Horizontal	-35.2	-27.0	8.2	Complied
5839.908	Horizontal	-34.9	-27.0	7.9	Complied
5960.031	Horizontal	-36.7	-27.0	9.7	Complied

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

Results: Middle Channel / Field Strength

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5439.977	Horizontal	57.7	74.0	16.3	Complied

Results: Middle Channel / Field Strength / Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
5439.977	Horizontal	46.6	0.2	46.8	54.0	7.2	Complied

Results: Top Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5519.769	Horizontal	-36.9	-27.0	9.9	Complied
5559.885	Horizontal	-36.9	-27.0	9.9	Complied
5639.992	Horizontal	-35.1	-27.0	8.1	Complied
5759.800	Horizontal	-35.8	-27.0	8.8	Complied
5840.031	Horizontal	-34.7	-27.0	7.7	Complied
5960.001	Horizontal	-37.1	-27.0	10.1	Complied

Results: Top Channel / Field Strength / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5439.877	Horizontal	56.8	74.0	17.2	Complied

Results: Top Channel / Field Strength / Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
5439.877	Horizontal	46.2	0.2	46.4	54.0	7.6	Complied

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

Test Summary:

Test Engineer:	Andrew Edwards	**Test Dates:**	22 June 2017 & 23 June 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Part 15.407(b)(4)(i),(7) & 15.209(a)
Test Method Used:	KDB 789033 II.G. & ANSI C63.10 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	26 to 27
Relative Humidity (%):	42 to 44

Note(s):

1. FCC Part 15.407(b)(4)(i) states for transmitters operating in the band 5.725 to 5.85 GHz: all emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. Part (b) (7) states the provisions of 15.205 apply e.g. restricted bands of operation.
2. Pre-scans were performed with the EUT transmitting on middle channel in 5.725 to 5.85 GHz 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 emissions seen in each band.
3. Measured field strength was converted to EIRP in accordance with KDB 789033 G.2.d)(iii) using a conversion factor of 95.2.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
5. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the test receiver as RF levels offsets.
6. The results table below show a maximum highest six emissions recorded as stated in ANSI C63.10 section 6.6.4.3. Therefore all other final measurements that are within 20 dB are archived on the UL VS LTD IT server and available for inspection if required.
7. All other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
8. In accordance with KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements, data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor calculated in Section 5.2.4 of this report was added to the measured result.
9. All measurements above 1 GHz were performed in an anechoic chamber (Asset Number K0017) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres 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 (5.725-5.85 GHz band operation) (continued)

Results: Bottom Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5480.027	Horizontal	-33.0	-27.0	6.0	Complied
5520.598	Horizontal	-34.3	-27.0	7.3	Complied
5560.175	Horizontal	-34.1	-27.0	7.1	Complied
5600.297	Horizontal	-31.7	-27.0	4.7	Complied
5662.483	Horizontal	-30.9	-27.0	3.9	Complied
5880.092	Horizontal	-36.3	-27.0	9.3	Complied

Results: Bottom Channel / Field Strength / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
3829.926	Horizontal	58.8	74.0	15.2	Complied
11489.175	Horizontal	56.9	74.0	17.1	Complied

Results: Bottom Channel / Field Strength / Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
3829.926	Horizontal	49.2	0.2	49.4	54.0	4.6	Complied
11489.175	Horizontal	44.8	0.2	45.0	54.0	9.0	Complied

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

Results: Middle Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5480.004	Horizontal	-32.7	-27.0	5.7	Complied
5520.060	Horizontal	-33.8	-27.0	6.8	Complied
5559.006	Horizontal	-33.2	-27.0	6.2	Complied
5599.752	Horizontal	-32.2	-27.0	5.2	Complied
5640.137	Horizontal	-33.3	-27.0	6.3	Complied
5703.914	Horizontal	-29.6	-27.0	2.6	Complied

Results: Middle Channel / Field Strength / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
3856.678	Horizontal	59.9	74.0	14.1	Complied
7713.375	Horizontal	56.8	74.0	17.2	Complied
11568.965	Horizontal	57.9	74.0	16.1	Complied

Results: Middle Channel / Field Strength / Average

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
3856.678	Horizontal	53.2	0.2	53.4	54.0	0.6	Complied
7713.375	Horizontal	53.6	0.2	53.8	54.0	0.2	Complied
11568.965	Horizontal	45.1	0.2	45.3	54.0	8.7	Complied

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

Results: Top Channel / EIRP

Frequency (MHz)	Antenna Polarity	Level (dBm)	Limit (dBm)	Margin (dB)	Result
5480.154	Horizontal	-31.9	-27.0	4.9	Complied
5520.060	Horizontal	-33.6	-27.0	6.6	Complied
5560.175	Horizontal	-31.7	-27.0	4.7	Complied
5600.022	Horizontal	-31.8	-27.0	4.8	Complied
5640.137	Horizontal	-32.6	-27.0	5.6	Complied
5720.647	Horizontal	-34.3	-27.0	7.3	Complied

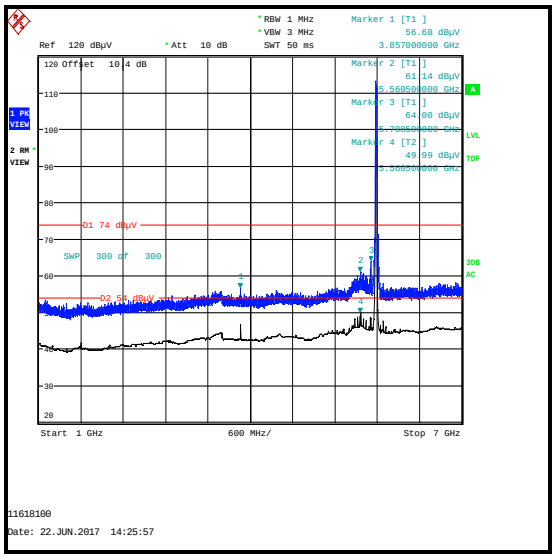
Results: Top Channel / Field Strength / Peak

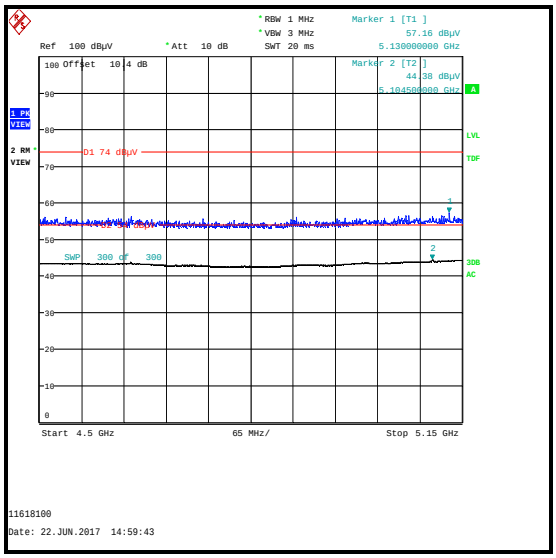
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
3883.365	Horizontal	59.2	74.0	14.8	Complied
11648.130	Horizontal	59.0	74.0	15.0	Complied

Results: Top Channel / Field Strength / Average

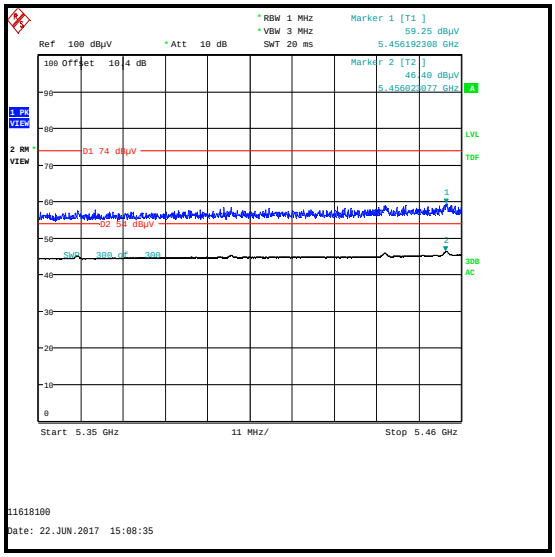
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Duty cycle correction factor (dB)	Corrected Level (dBµV/m) (dBm)	Limit (dBµV/m)	Margin (dB)	Result
3883.365	Horizontal	52.6	0.2	52.8	54.0	1.2	Complied
11648.130	Horizontal	45.9	0.2	46.1	54.0	7.9	Complied

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

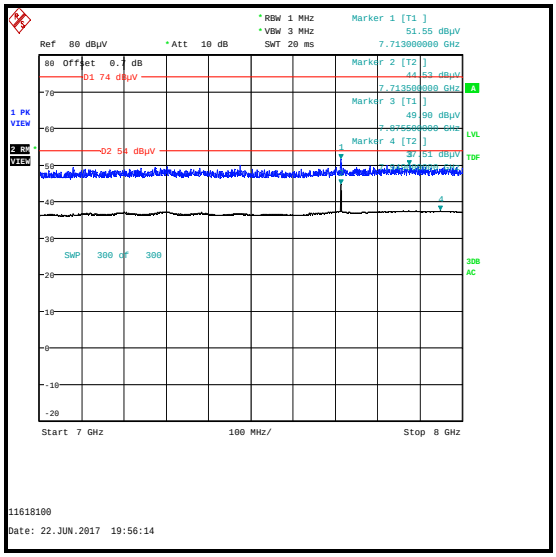




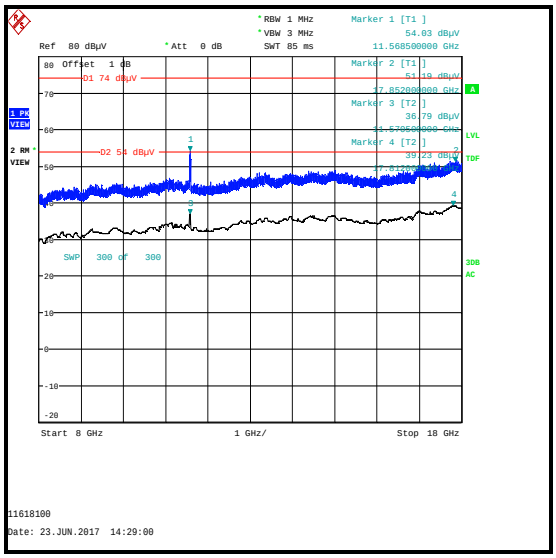
Restricted Band 4.5 GHz to 5.15 GHz

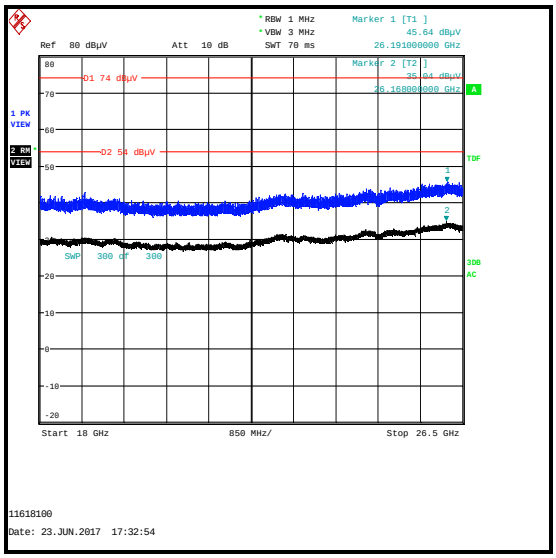


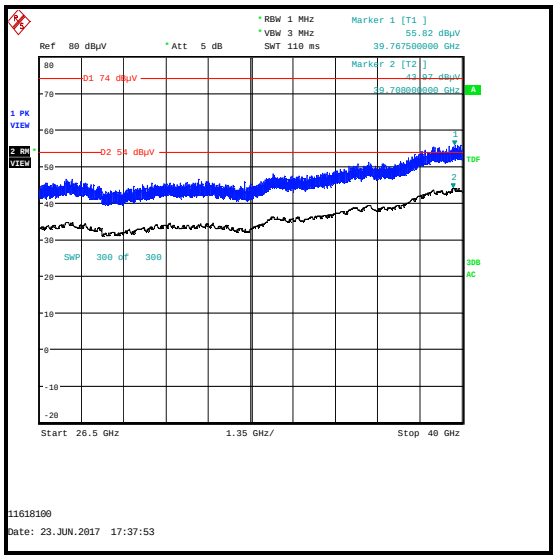
Restricted Band 5.35 GHz to 5.46 GHz



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







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

Transmitter Out of Band Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Feb 2018	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Apr 2018	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	13 Apr 2018	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	11 Apr 2018	12
A2891	Pre-Amplifier	Schwarzbeck	BBV 9718	9718-306	11 Apr 2018	12
A2893	Pre-Amplifier	Schwarzbeck	BBV 9721	9721-021	11 Apr 2018	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 653	11 Apr 2018	12
A2890	Antenna	Schwarzbeck	HWRD 750	014	11 Apr 2018	12
A2892	Antenna	Schwarzbeck	BBHA 9170	9170-727	11 Apr 2018	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	03 Mar 2018	12
A2947	High Pass Filter	AtlanTecRF	AFH-07000	1601900001	18 May 2018	12

5.2.9. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Dates:**	15 June 2017 & 16 June 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Parts 15.407(b)(1),(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10 & KDB 789033 II.G.

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	40

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:
    - Highest power
        - 802.11a SISO – Antenna Wi-Fi 1 / 48 Mbit/s
        - 802.11n HT20 SISO – Antenna Wi-Fi 1 / 52 Mbit/s / MCS5
        - 802.11n HT40 SISO – Antenna Wi-Fi 2 / 81 Mbit/s / MCS4
        - 802.11a MIMO - 6 Mbit/s
        - 802.11n HT20 MIMO – 52 Mbit/s / MCS5
        - 802.11n HT40 MIMO – 81 Mbit/s / MCS4
    - Widest 26 dB bandwidth
        - 802.11a – SISO Antenna Wi-Fi 2 / 9 Mbit/s
        - 802.11n HT20 / SISO – Antenna Wi-Fi 2 / 6.5 Mbit/s / MCS0
        - 802.11n HT40 / SISO – Antenna Wi-Fi 2 / 13.5 Mbit/s / MCS0
        - 802.11a MIMO – 9 Mbit/s
        - 802.11n HT20 MIMO – 6.5 Mbit/s / MCS0
        - 802.11n HT40 MIMO – 13.5 Mbit/s / MCS0
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 KDB 789033 Section II.G.6.c) Method AD (vii), for average measurements, data rates where the EUT was transmitting <98% duty cycle, the duty cycle correction factor calculated in Section 5.2.4 of this report was added to the measured results.

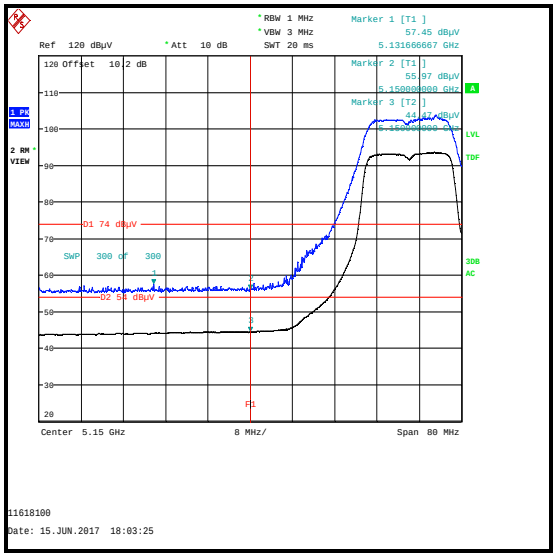
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 2 / 9 Mbit/s / Peak

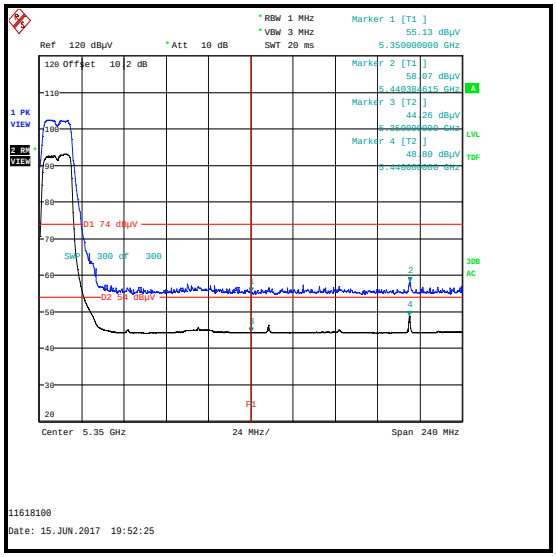
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5131.667	57.5	74.0	16.5	Complied
5150	56.0	74.0	18.0	Complied
5350	55.1	74.0	18.9	Complied
5440.385	58.1	74.0	15.9	Complied

Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 2 / 9 Mbit/s / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.5	0.2	44.7	54.0	9.3	Complied
5350	44.3	0.2	44.5	54.0	9.5	Complied
5440.000	48.8	0.2	49.0	54.0	5.0	Complied



Lower Band Edge



Upper Band Edge

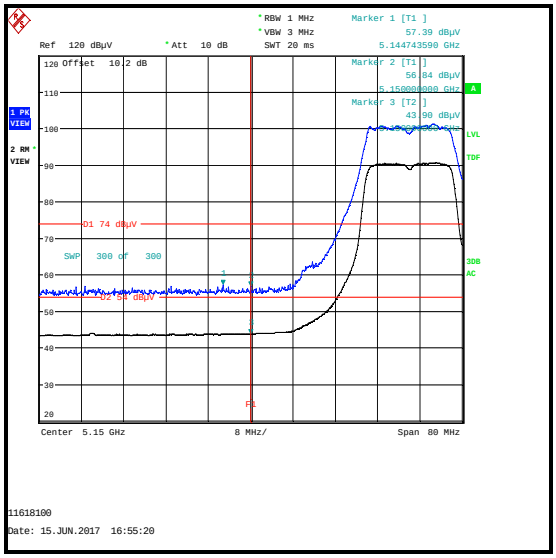
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 1 / 48 Mbit/s Peak

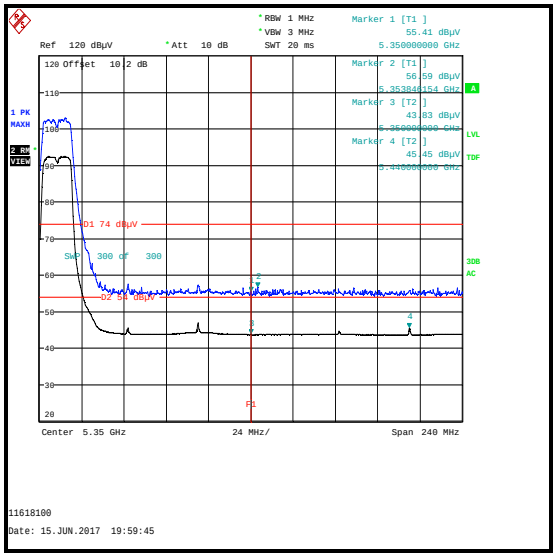
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5144.744	57.4	74.0	16.6	Complied
5150	56.8	74.0	17.2	Complied
5350	55.4	74.0	18.6	Complied
5353.846	56.6	74.0	17.4	Complied

Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 1 / 48 Mbit/s / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	43.9	0.7	44.6	54.0	9.4	Complied
5350	43.8	0.7	44.5	54.0	9.5	Complied
5440.000	45.5	0.7	46.2	54.0	7.8	Complied



Lower Band Edge



Upper Band Edge

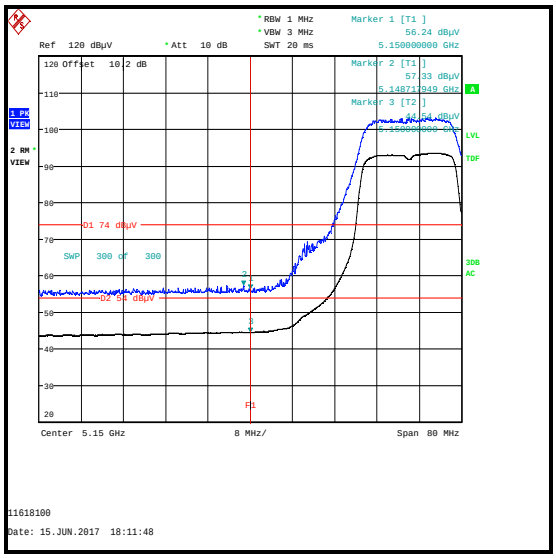
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n HT20 / SISO – Antenna Wi-Fi 2 / 6.5 Mbit/s / MCS0 / Peak

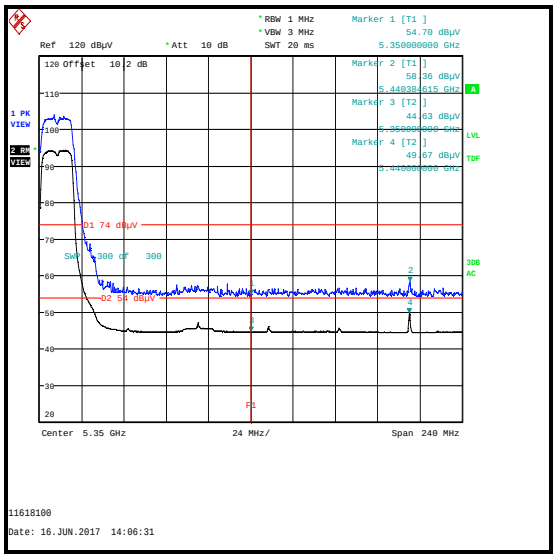
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5148.718	57.3	74.0	16.7	Complied
5150	56.2	74.0	17.8	Complied
5350	54.7	74.0	19.3	Complied

Results: 802.11n HT20 / SISO – Antenna Wi-Fi 2 / 6.5 Mbit/s / MCS0 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.5	0.1	44.6	54.0	9.4	Complied
5350	44.6	0.1	44.7	54.0	9.3	Complied



Lower Band Edge



Upper Band Edge

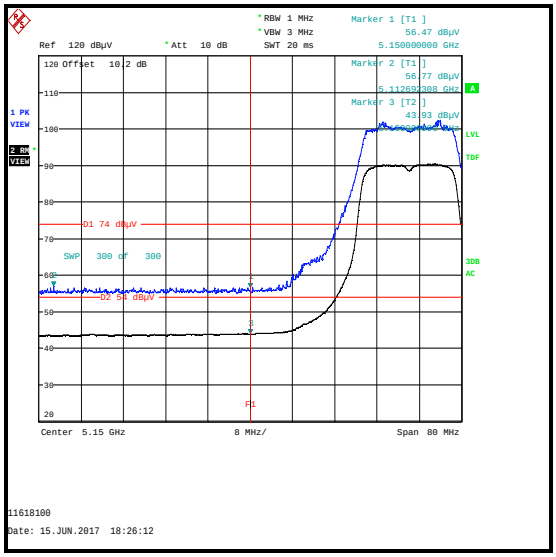
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT20 / SISO – Antenna Wi-Fi 1 / 52.0 Mbit/s / MCS5 / Peak

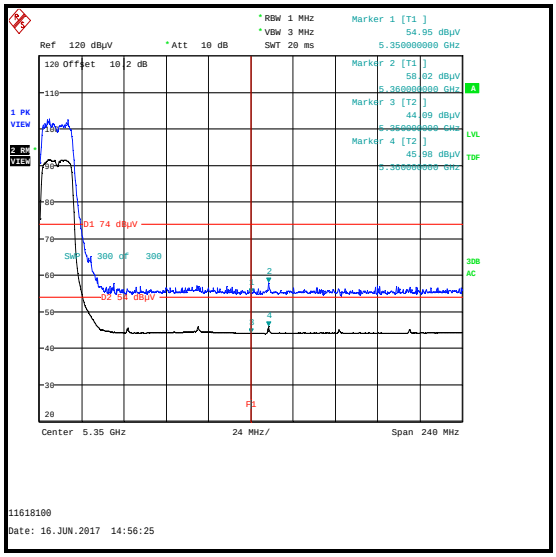
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5112.692	56.8	74.0	17.2	Complied
5150	56.5	74.0	17.5	Complied
5350	55.0	74.0	19.0	Complied
5360.000	58.0	74.0	16.0	Complied

Results: 802.11n / HT20 / SISO – Antenna Wi-Fi 1 / 52.0 Mbit/s / MCS5 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	43.9	0.7	44.6	54.0	9.4	Complied
5350	44.1	0.7	44.8	54.0	9.2	Complied
5360.000	46.0	0.7	46.7	54.0	7.3	Complied



Lower Band Edge



Upper Band Edge

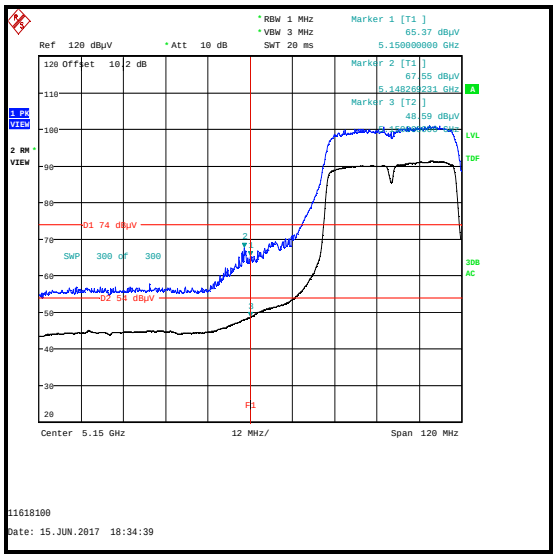
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 2 / 13.5 Mbit/s / MCS0 / Peak

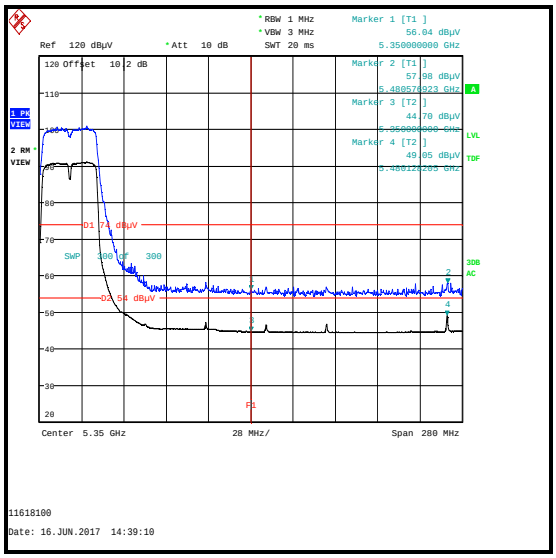
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5148.269	67.6	74.0	6.4	Complied
5150	65.4	74.0	8.6	Complied
5350	56.0	74.0	18.0	Complied

Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 2 / 13.5 Mbit/s / MCS0 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	48.6	0.2	48.8	54.0	5.2	Complied
5350	44.7	0.2	44.9	54.0	9.1	Complied



Lower Band Edge



Upper Band Edge

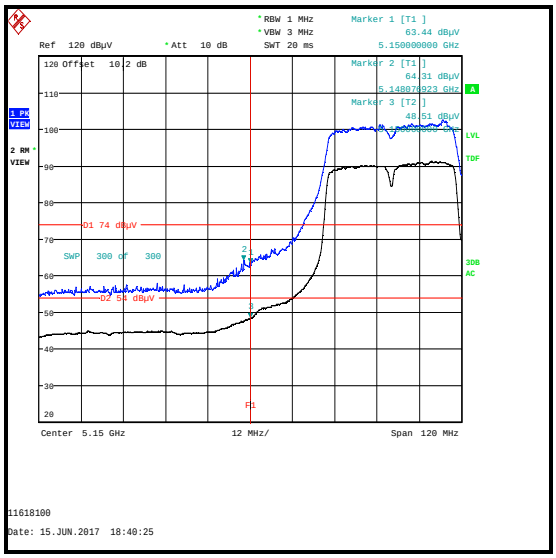
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 2 / 81.0 Mbit/s / MCS4 / Peak

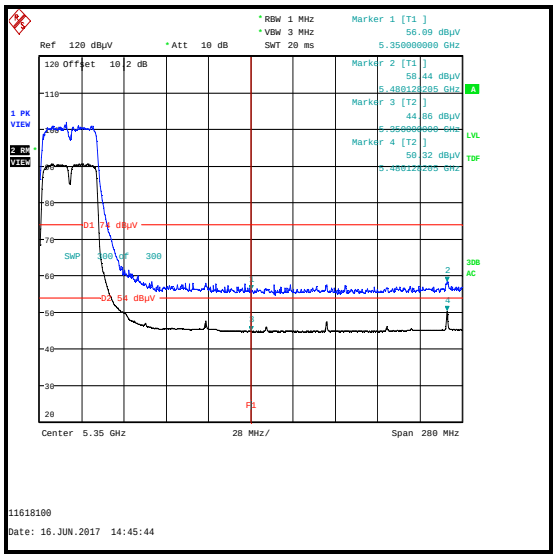
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5148.077	64.3	74.0	9.7	Complied
5150	63.4	74.0	10.6	Complied
5350	56.1	74.0	17.9	Complied

Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 2 / 81.0 Mbit/s / MCS4 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	48.5	0.7	49.2	54.0	4.8	Complied
5350	44.9	0.7	45.6	54.0	8.4	Complied



Lower Band Edge



Upper Band Edge

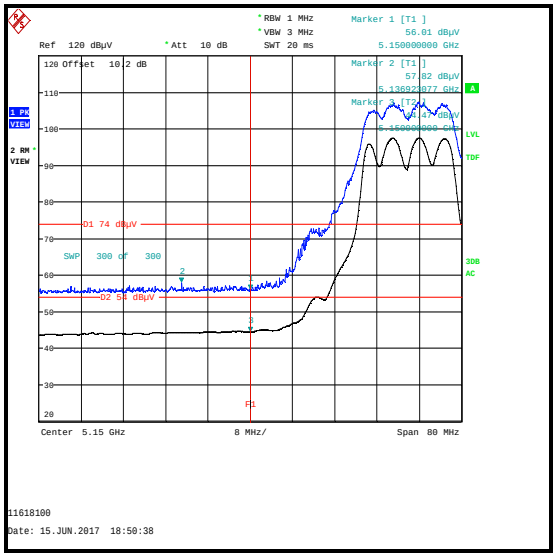
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / MIMO - 6 Mbit/s / Peak

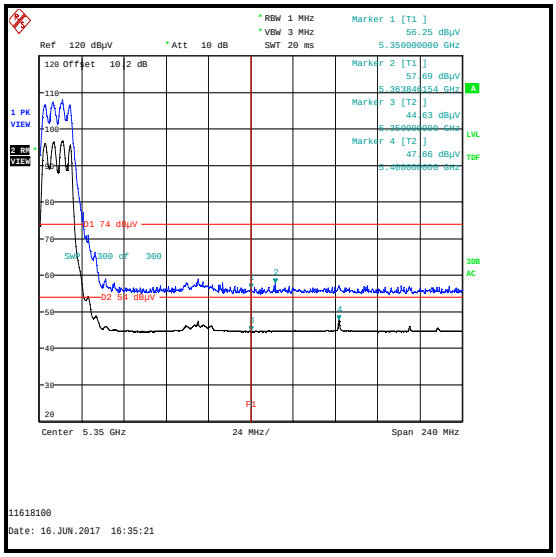
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5136.923	57.8	74.0	16.2	Complied
5150	56.0	74.0	18.0	Complied
5350	56.3	74.0	17.7	Complied
5363.846	57.7	74.0	16.3	Complied

Results: 802.11a / 20 MHz / MIMO - 6 Mbit/s / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.5	0.1	44.6	54.0	9.4	Complied
5350	44.6	0.1	44.7	54.0	9.3	Complied
5400.000	47.7	0.1	47.8	54.0	6.2	Complied



Lower Band Edge



Upper Band Edge

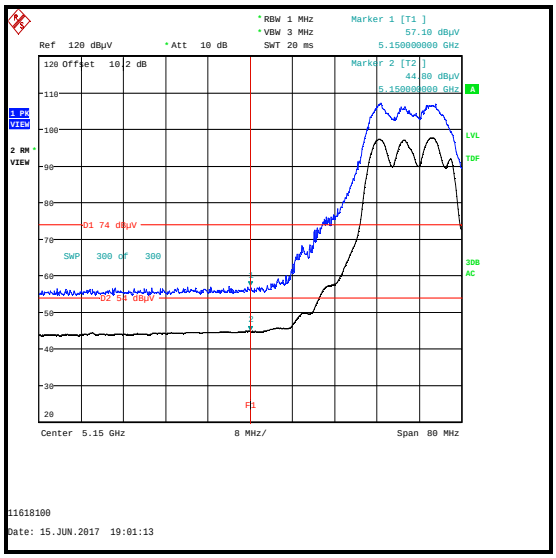
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / MIMO - 9 Mbit/s / Peak

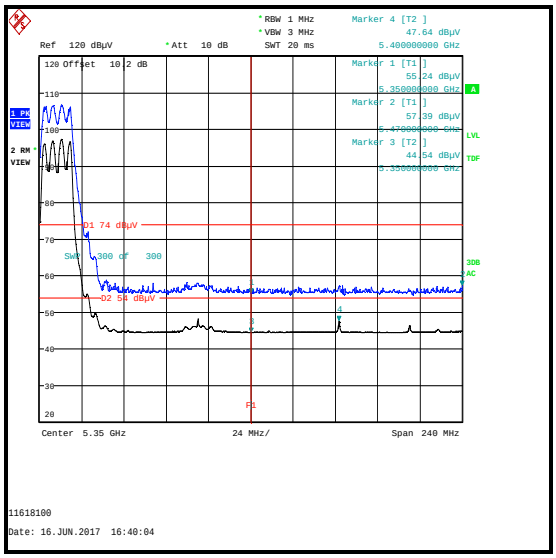
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	57.1	74.0	16.9	Complied
5350	55.2	74.0	18.8	Complied

Results: 802.11a / 20 MHz / MIMO - 9 Mbit/s / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.8	0.2	45.0	54.0	9.0	Complied
5350	44.5	0.2	44.7	54.0	9.3	Complied
5400.000	47.6	0.2	47.8	54.0	6.2	Complied



Lower Band Edge



Upper Band Edge

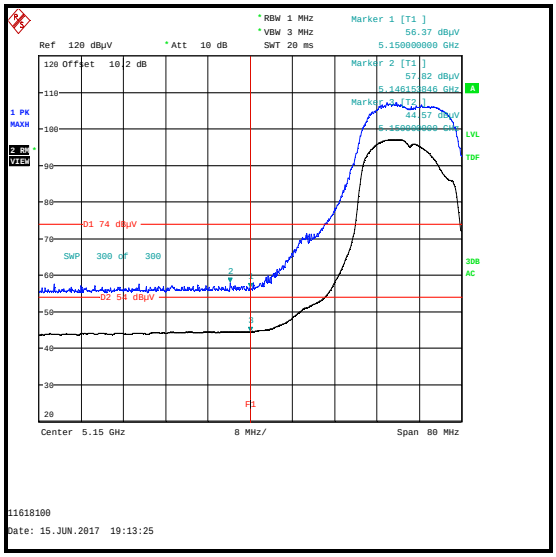
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT20 / MIMO – 6.5 Mbit/s / MCS0 / Peak

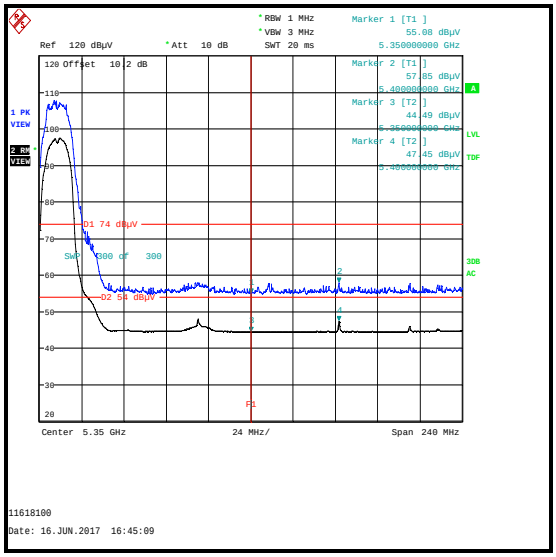
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5146.154	57.8	74.0	16.2	Complied
5150	56.4	74.0	17.6	Complied
5350	55.1	74.0	18.9	Complied
5400.000	57.9	74.0	16.1	Complied

Results: 802.11n / HT20 / MIMO – 6.5 Mbit/s / MCS0 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.6	0.1	44.7	54.0	9.3	Complied
5350	44.5	0.1	44.6	54.0	9.4	Complied
5400.000	47.5	0.1	47.6	54.0	6.4	Complied



Lower Band Edge



Upper Band Edge

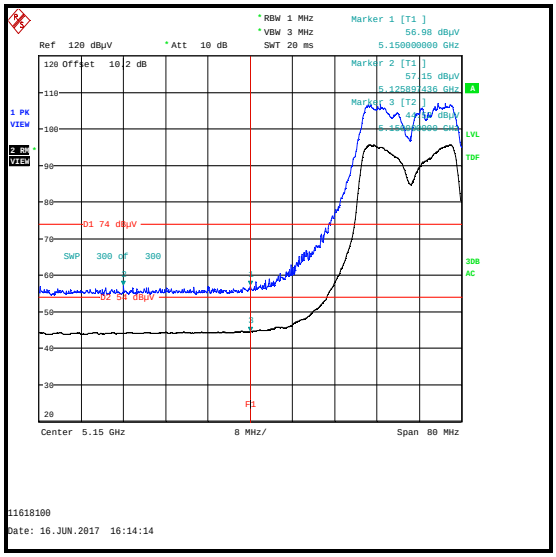
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT20 / MIMO – 52 Mbit/s / MCS5 / Peak

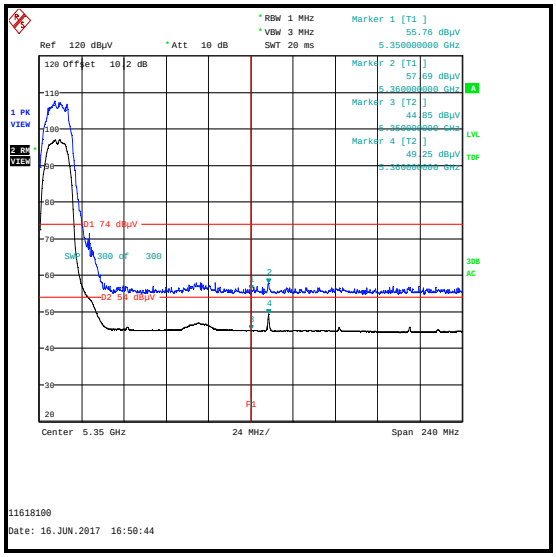
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5125.897	57.2	74.0	16.8	Complied
5150	57.0	74.0	17.0	Complied
5350	55.8	74.0	18.2	Complied
5360.000	57.7	74.0	16.3	Complied

Results: 802.11n / HT20 / MIMO – 52 Mbit/s / MCS5 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	44.5	0.7	45.2	54.0	8.8	Complied
5350	44.9	0.7	45.6	54.0	8.4	Complied
5360.000	49.3	0.7	50.0	54.0	4.0	Complied



Lower Band Edge



Upper Band Edge

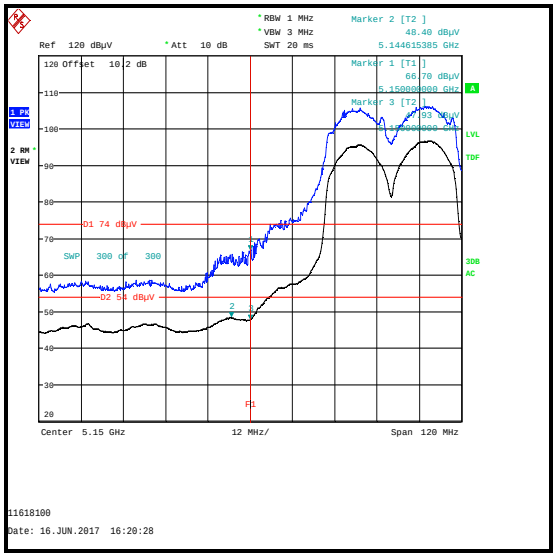
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT40 / MIMO – 13.5 Mbit/s / MCS0 / Peak

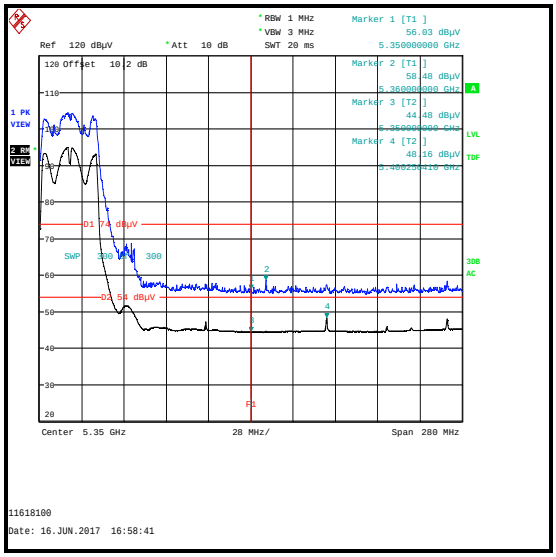
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5150	66.7	74.0	7.3	Complied
5350	56.0	74.0	18.0	Complied
5360.000	58.5	74.0	15.5	Complied

Results: 802.11n / HT40 / MIMO – 13.5 Mbit/s / MCS0 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5144.615	48.4	0.2	48.6	54.0	5.4	Complied
5150	47.9	0.2	48.1	54.0	5.9	Complied
5350	44.5	0.2	44.7	54.0	9.3	Complied
5400.256	48.2	0.2	48.4	54.0	5.6	Complied



Lower Band Edge



Upper Band Edge

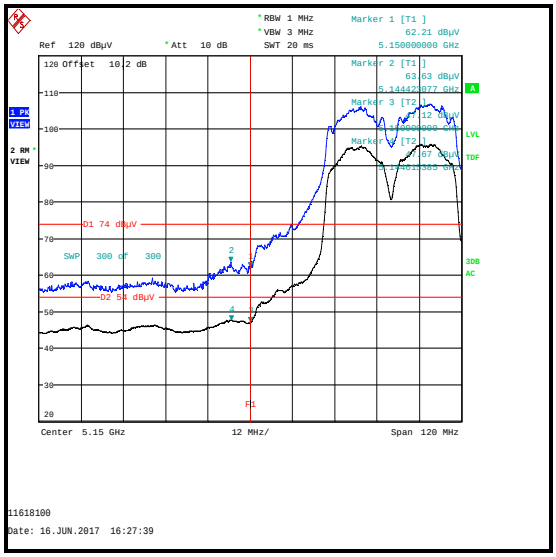
Transmitter Band Edge Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11n / HT40 / MIMO – 81 Mbit/s / MCS4 / Peak

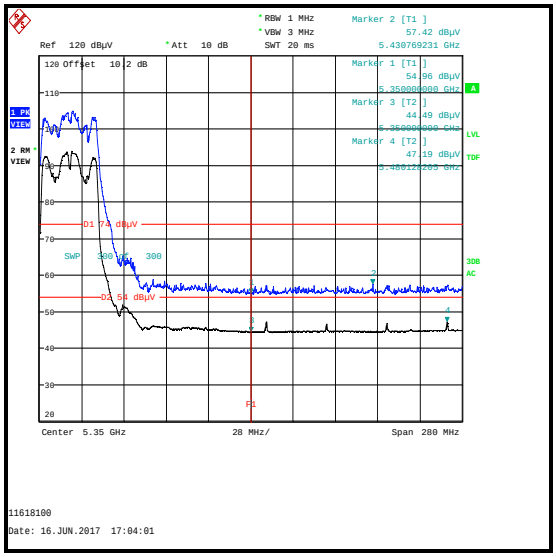
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5144.423	63.6	74.0	10.4	Complied
5150	62.2	74.0	11.8	Complied
5350	55.0	74.0	19.0	Complied
5430.769	57.4	74.0	16.6	Complied

Results: 802.11n / HT40 / MIMO – 81 Mbit/s / MCS4 / Average

Frequency (MHz)	Level (dBµV/m)	Duty Cycle correction (dB)	Corrected Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5144.615	47.7	0.7	48.4	54.0	5.6	Complied
5150	47.1	0.7	47.8	54.0	6.2	Complied
5350	44.5	0.7	45.2	54.0	8.8	Complied



Lower Band Edge



Upper Band Edge

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

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	19 June 2017
Test Sample Serial Number:	04423851816340100265		

FCC Reference:	Parts 15.407(b)(4)(i),(7), 15.205 & 15.209(a)
Test Method Used:	ANSI C63.10 Section 6.10 & KDB 789033 II.G.

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	41

Note(s):

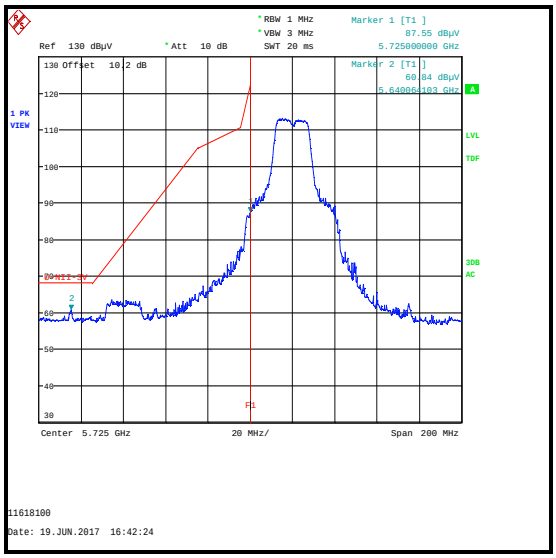
1. An inquiry was made to the FCC and the response confirmed band edge measurements need only be performed in the EUT modes that produce the highest power and the widest bandwidths. The modes that produced the highest power and widest bandwidth were:
    - Highest power
        - 802.11a SISO – Antenna Wi-Fi 1 / 12 Mbit/s
        - 802.11n HT20 SISO – Antenna Wi-Fi 1 / 19.5 Mbit/s / MCS2
        - 802.11n HT40 SISO – Antenna Wi-Fi 1 / 40.5 Mbit/s / MCS2
        - 802.11a MIMO – 9 Mbit/s
        - 802.11n HT20 MIMO – 26 Mbit/s / MCS3
        - 802.11n HT40 MIMO – 27 Mbit/s / MCS1
    - Widest 26 dB bandwidth
        - 802.11a SISO – Antenna Wi-Fi 2 / 9 Mbit/s
        - 802.11n HT20 SISO – Antenna Wi-Fi 2 / 6.5 Mbit/s / MCS0
        - 802.11n HT40 SISO – Antenna Wi-Fi 2 / 13.5 Mbit/s / MCS0
        - 802.11n HT20 MIMO – 6.5 Mbit/s / MCS0
        - 802.11n HT40 MIMO – 13.5 Mbit/s / MCS0
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 completeness, results are shown as EIRP in dBm and also as field strength in dBµV/m. Measured field strength was converted to EIRP in accordance with KDB 789033 G.2.d)(iii) using a conversion factor of 95.2.

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

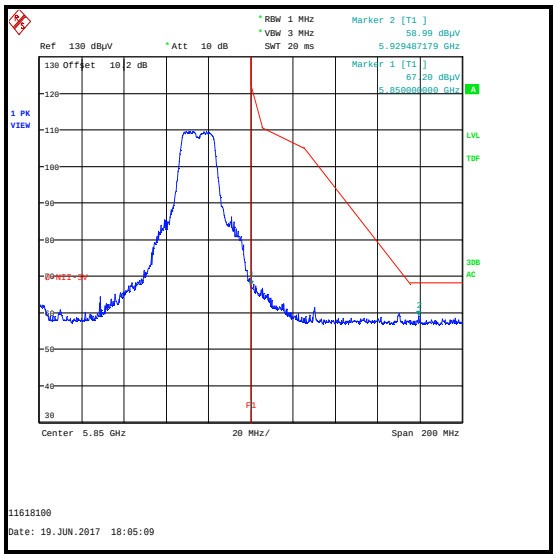
Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 2 / 9 Mbit/s

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-34.4	-27.0	7.4	Complied
5725	-7.6	27.0	34.6	Complied
5850	-28.0	27.0	55.0	Complied
5929.487	-36.2	-27.0	9.2	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	60.8	68.2	7.4	Complied
5725	87.6	122.2	34.6	Complied
5850	67.2	122.2	55.0	Complied
5929.487	59.0	68.2	9.2	Complied



Lower Band Edge



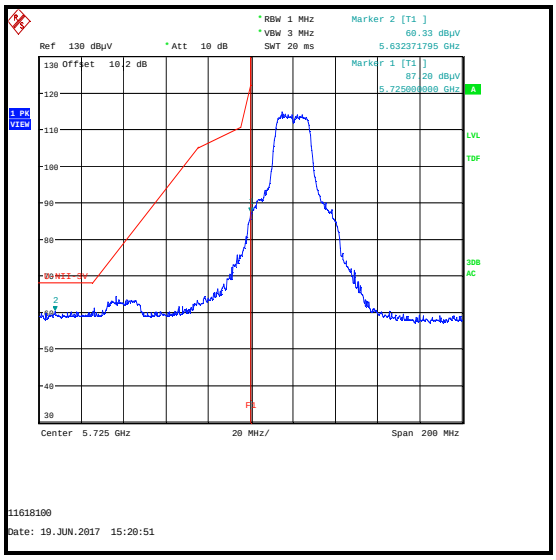
Upper Band Edge

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

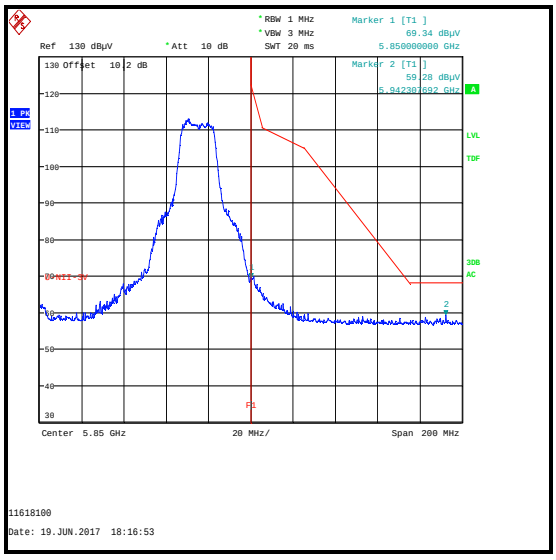
Results: 802.11a / 20 MHz / SISO – Antenna Wi-Fi 1 / 12 Mbit/s

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5632.372	-34.9	-27.0	7.9	Complied
5725	-8.0	27.0	35.0	Complied
5850	-25.9	27.0	52.9	Complied
5942.308	-35.9	-27.0	8.9	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5632.372	60.3	68.2	7.9	Complied
5725	87.2	122.2	35.0	Complied
5850	69.3	122.2	52.9	Complied
5942.308	59.3	68.2	8.9	Complied



Lower Band Edge



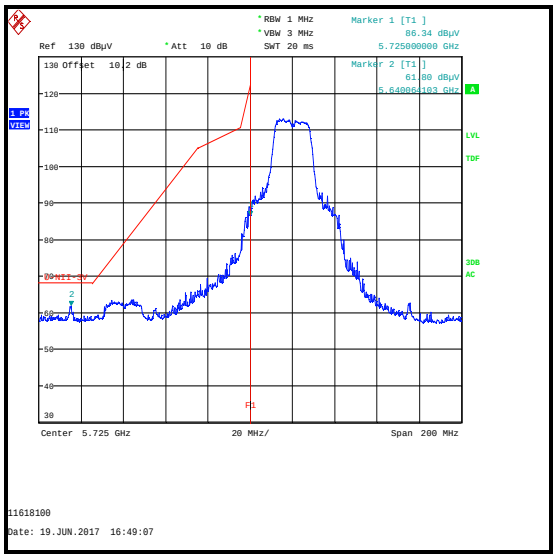
Upper Band Edge

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

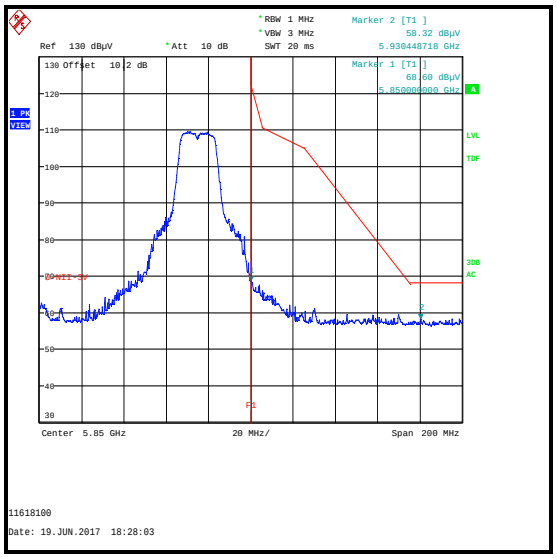
Results: HT20 SISO – Antenna Wi-Fi 2 / 6.5 Mbit/s / MCS0

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-33.4	-27.0	6.4	Complied
5725	-8.9	27.0	35.9	Complied
5850	-26.6	27.0	53.6	Complied
5930.449	-36.9	-27.0	9.9	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	61.8	68.2	6.4	Complied
5725	86.3	122.2	35.9	Complied
5850	68.6	122.2	53.6	Complied
5930.449	58.3	68.2	9.9	Complied



Lower Band Edge



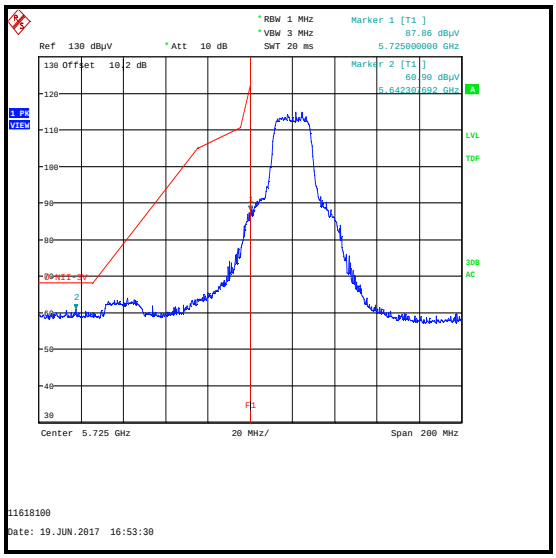
Upper Band Edge

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

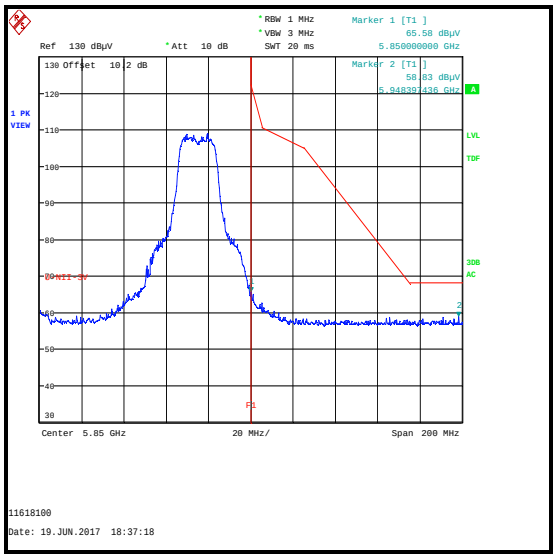
Results: 802.11n / HT20 / SISO – Antenna Wi-Fi 1 / 19.5 Mbit/s / MCS2

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5642.308	-34.3	-27.0	7.3	Complied
5725	-7.3	27.0	34.3	Complied
5850	-29.6	27.0	56.6	Complied
5948.397	-36.4	-27.0	9.4	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5642.308	60.9	68.2	7.3	Complied
5725	87.9	122.2	34.3	Complied
5850	65.6	122.2	56.6	Complied
5948.397	58.8	68.2	9.4	Complied



Lower Band Edge



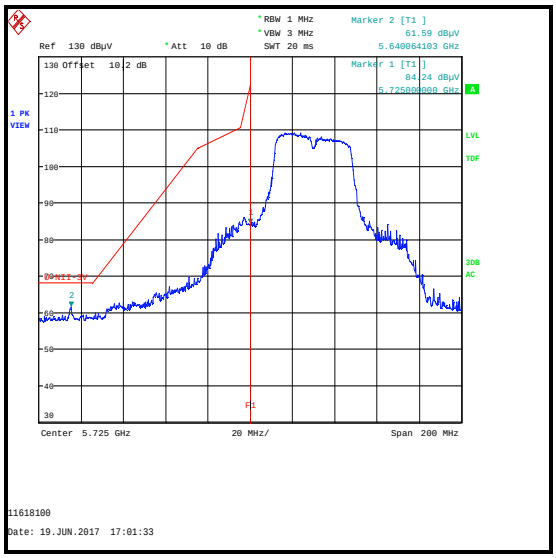
Upper Band Edge

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

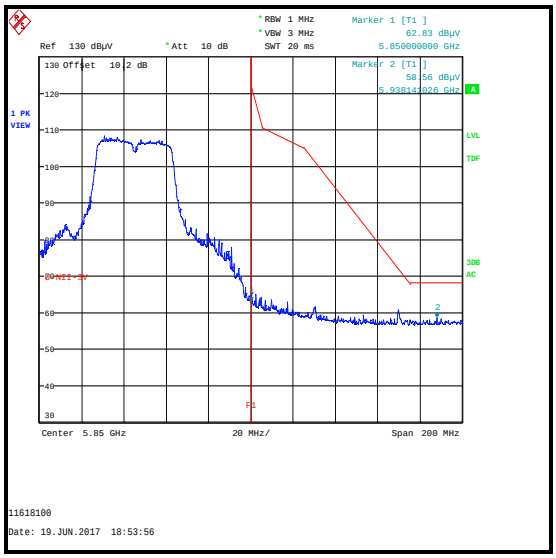
Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 2 / 13.5 Mbit/s / MCS0

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-33.6	-27.0	6.6	Complied
5725	-11.0	27.0	38.0	Complied
5850	-32.4	27.0	59.4	Complied
5938.141	-36.6	-27.0	9.6	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	61.6	68.2	6.6	Complied
5725	84.2	122.2	38.0	Complied
5850	62.8	122.2	59.4	Complied
5938.141	58.6	68.2	9.6	Complied



Lower Band Edge



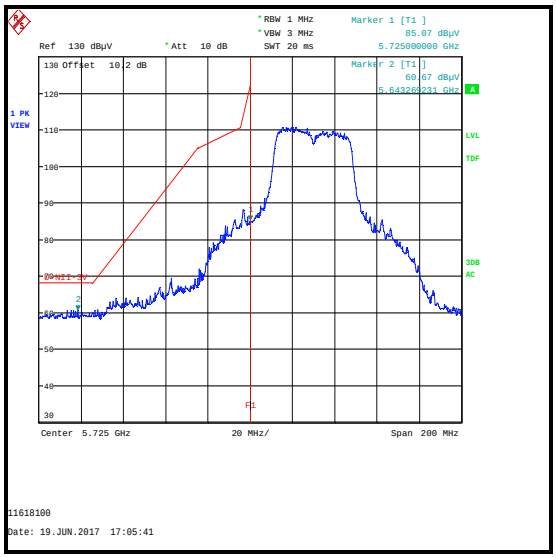
Upper Band Edge

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

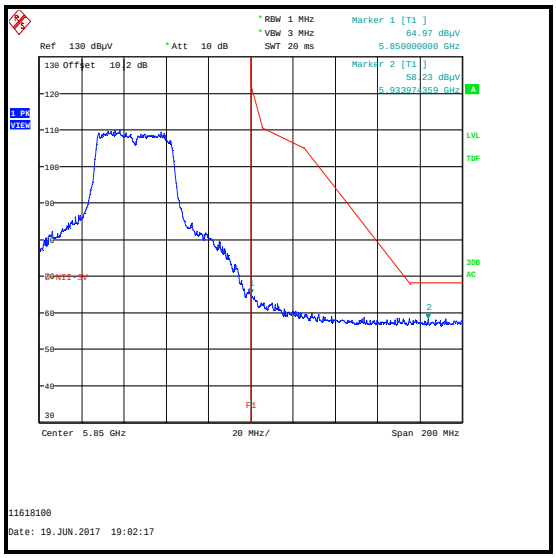
Results: 802.11n / HT40 / SISO – Antenna Wi-Fi 1 / 40.5 Mbit/s / MCS2

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5643.269	-34.5	-27.0	7.5	Complied
5725	-10.1	27.0	37.1	Complied
5850	-30.2	27.0	57.2	Complied
5933.974	-37.0	-27.0	10.0	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5643.269	60.7	68.2	7.5	Complied
5725	85.1	122.2	37.1	Complied
5850	65.0	122.2	57.2	Complied
5933.974	58.2	68.2	10.0	Complied



Lower Band Edge



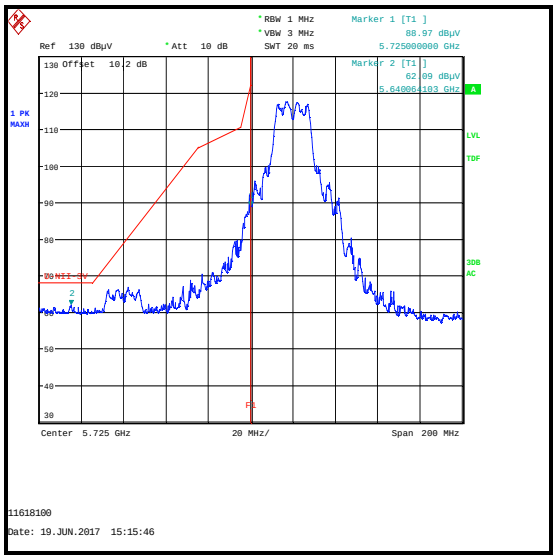
Upper Band Edge

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

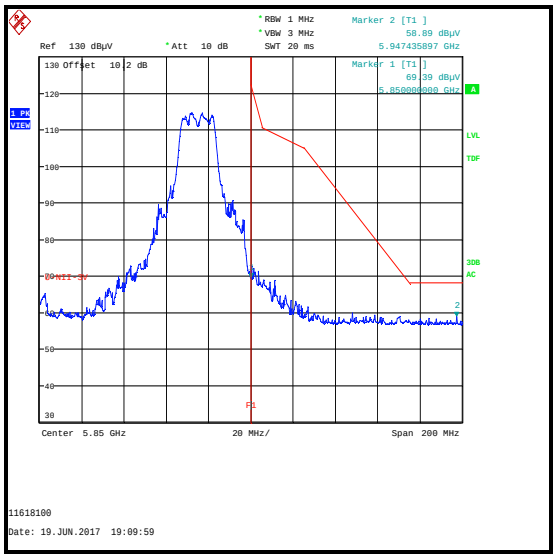
Results: 802.11a / 20 MHz / MIMO – 9 Mbit/s

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-33.1	-27.0	6.1	Complied
5725	-6.2	27.0	33.2	Complied
5850	-25.8	27.0	52.8	Complied
5947.436	-36.3	-27.0	9.3	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	62.1	68.2	6.1	Complied
5725	89.0	122.2	33.2	Complied
5850	69.4	122.2	52.8	Complied
5947.436	58.9	68.2	9.3	Complied



Lower Band Edge



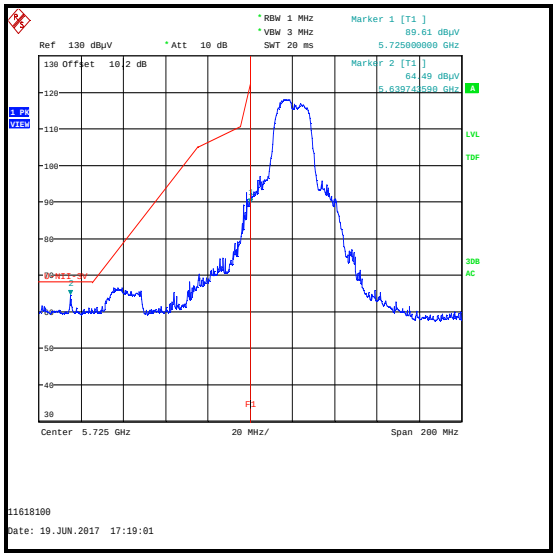
Upper Band Edge

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

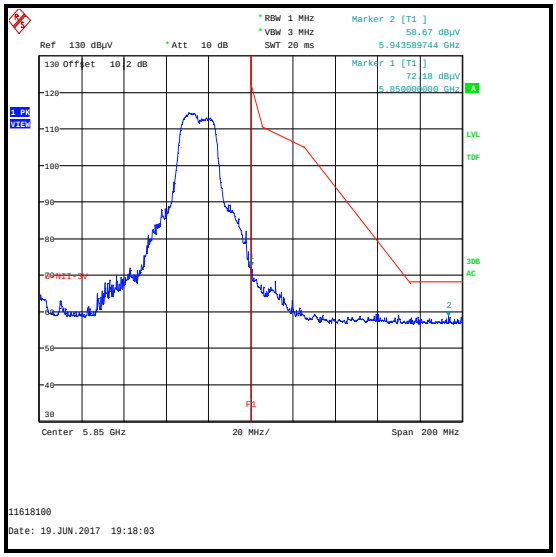
Results: 802.11n / HT20 / MIMO – 6.5 Mbit/s / MCS0

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5639.744	-30.7	-27.0	3.7	Complied
5725	-5.6	27.0	32.6	Complied
5850	-23.0	27.0	50.0	Complied
5943.590	-36.5	-27.0	9.5	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5639.744	64.5	68.2	3.7	Complied
5725	89.6	122.2	32.6	Complied
5850	72.2	122.2	50.0	Complied
5943.590	58.7	68.2	9.5	Complied



Lower Band Edge



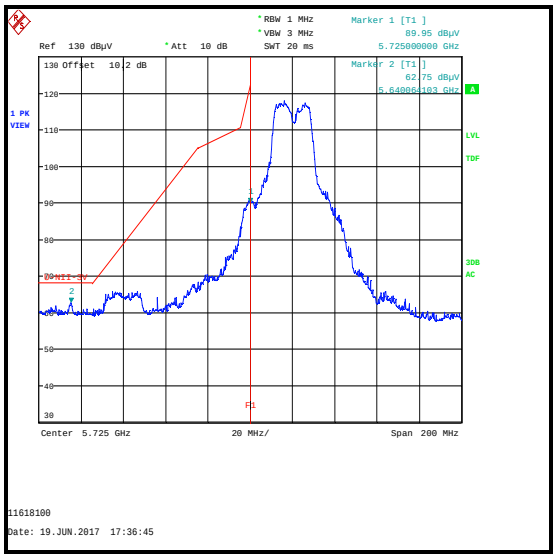
Upper Band Edge

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

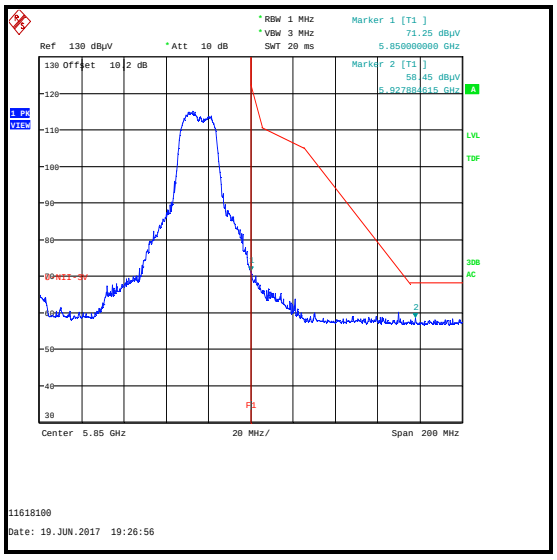
Results: 802.11n / HT20 / MIMO – 26.0 Mbit/s / MCS3

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-32.4	-27.0	5.4	Complied
5725	-5.2	27.0	32.2	Complied
5850	-23.9	27.0	50.9	Complied
5927.885	-36.7	-27.0	9.7	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	62.8	68.2	5.4	Complied
5725	90.0	122.2	32.2	Complied
5850	71.3	122.2	50.9	Complied
5927.885	58.5	68.2	9.7	Complied



Lower Band Edge



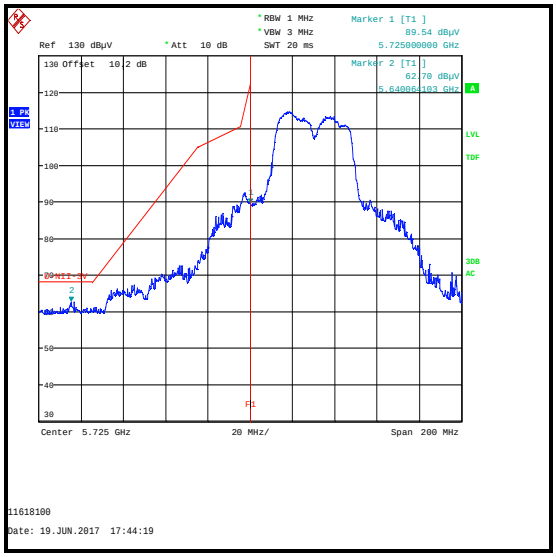
Upper Band Edge

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

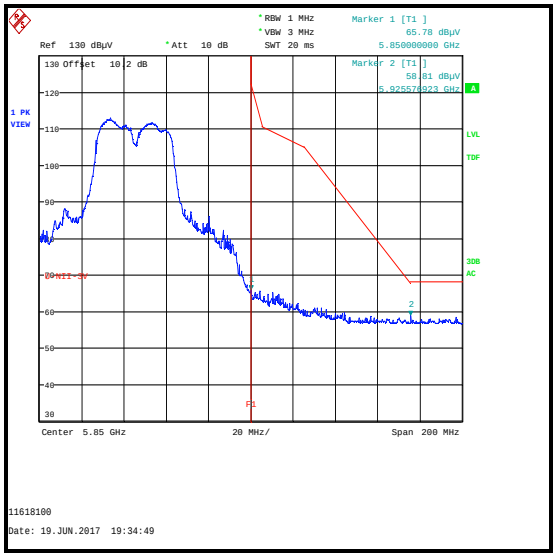
Results: 802.11n / HT40 / MIMO – 13.5 Mbit/s / MCS0

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-32.5	-27.0	5.5	Complied
5725	-5.7	27.0	32.7	Complied
5850	-29.4	27.0	56.4	Complied
5925.577	-36.4	-27.0	9.4	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	62.7	68.2	5.5	Complied
5725	89.5	122.2	32.7	Complied
5850	65.8	122.2	56.4	Complied
5925.577	58.8	68.2	9.4	Complied



Lower Band Edge



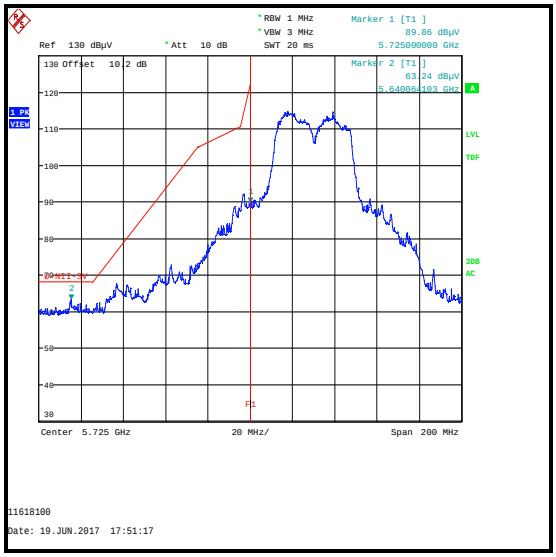
Upper Band Edge

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

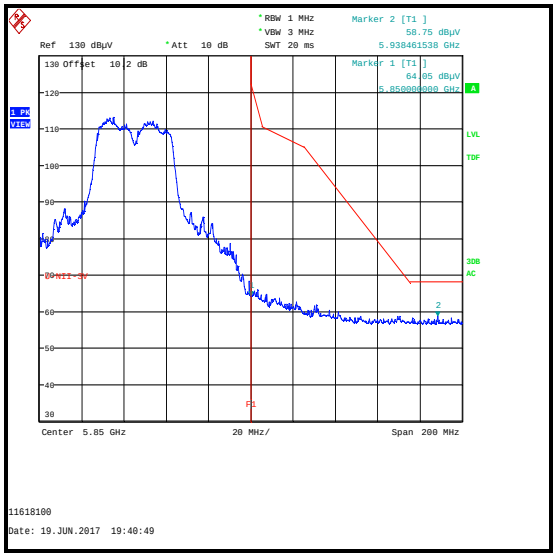
Results: 802.11n / HT40 MIMO – 27.0 Mbit/s / MCS1

Frequency (MHz)	Level (dBm)	Limit (dBm/MHz)	Margin (dB)	Result
5640.064	-32.0	-27.0	5.0	Complied
5725	-5.3	27.0	32.3	Complied
5850	-31.1	27.0	58.1	Complied
5938.462	-36.4	-27.0	9.4	Complied

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
5640.064	63.2	68.2	5.0	Complied
5725	89.9	122.2	32.3	Complied
5850	64.1	122.2	58.1	Complied
5938.462	58.8	68.2	9.4	Complied



Lower Band Edge



Upper Band Edge

Transmitter Band Edge Radiated Emissions (continued)

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2003	Thermohygrometer	Testo	608-H1	45046641	22 Feb 2018	12
K0017	3m RSE Chamber	Rainford EMC	N/A	N/A	14 Apr 2018	12
M1995	Test Receiver	Rohde & Schwarz	ESU40	100428	13 Apr 2018	12
A2863	Pre-Amplifier	Agilent	8449B	3008A02100	11 Apr 2018	12
A2889	Antenna	Schwarzbeck	BBHA 9120 B	BBHA 9120 B 653	11 Apr 2018	12
A2916	Attenuator	AtlanTecRF	AN18W5-10	832827#1	03 Mar 2018	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 5.85 GHz	95%	±1.13 dB
Peak Power Spectral Density	5.15 GHz to 5.85 GHz	95%	±1.13 dB
99% Emission Bandwidth	5.15 GHz to 5.85 GHz	95%	±3.92 %
26 dB Emission Bandwidth	5.15 GHz to 5.85 GHz	95%	±4.59 %
Minimum 6 dB Emission Bandwidth	5.15 GHz to 5.85 GHz	95%	±4.59 %
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
2.0	1 8	-	Added 15.403 to Test Standard list Changed Model No. 'Hera604' to 'H604V4' Section 3.1: Changed Model No. 'Hera604' to 'H604V4' Changed Brand Name 'Hera' to 'Hera 604' Section 3.2: 2nd paragraph removed Inserted FCC ID for cellular radio part

--- END OF REPORT ---