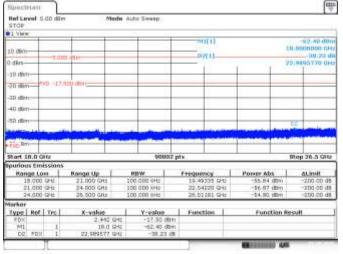


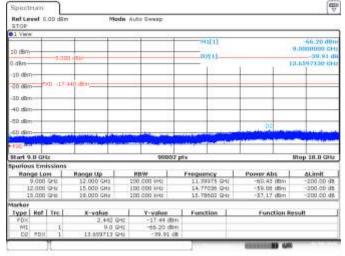
Cale: 10.341(2010: 1703:43)

CH7, 802.11he40, HE0, SISO A, Range 30MHz to 9GHz -Delta Marker Measurement



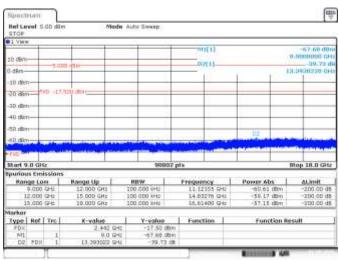
Date: 10.JAN 2010 17:04:43

CH7, 802.11he40, HE0, SISO A, Range 18GHz to 26.5GHz -Delta Marker Measurement



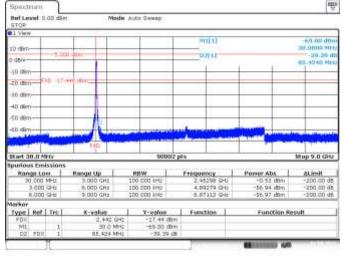
Caller B.JAN 2019 15 25:36

CH7, 802.11he40, HE0, SISO B, Range 9GHz to 18GHz -Delta Marker Measurement



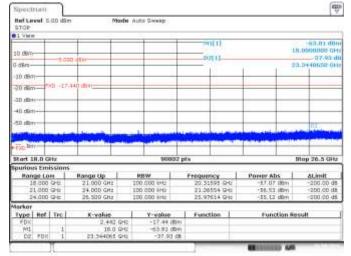
Date: 10.34N2010 17:0413

CH7, 802.11he40, HE0, SISO A, Range 9GHz to 18GHz -Delta Marker Measurement



Date: 8.JAN 2019 15/25/09

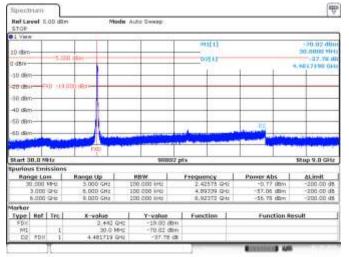
CH7, 802.11he40, HE0, SISO B, Range 30MHz to 9GHz -Delta Marker Measurement



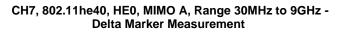
Cale: 8.JPN 2019 15 20 CV

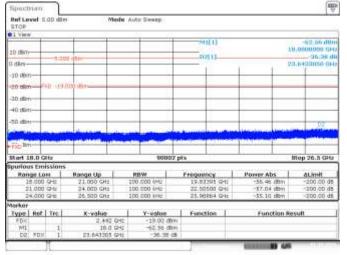
CH7, 802.11he40, HE0, SISO B, Range 18GHz to 26.5GHz - Delta Marker Measurement





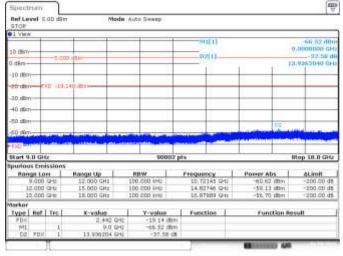
Cale: 10.3413019 100730





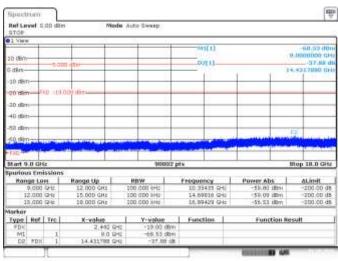
Cale 10.3412010 100826

CH7, 802.11he40, HE0, MIMO A, Range 18GHz to 26.5GHz - Delta Marker Measurement



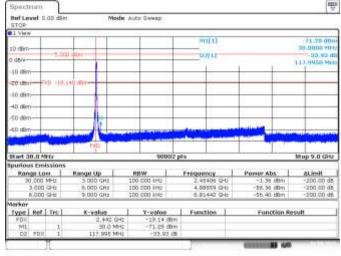
Cale 9.4413019 100000

CH7, 802.11he40, HE0, MIMO B, Range 9GHz to 18GHz -Delta Marker Measurement



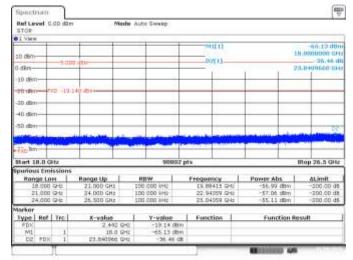
Date: 10.341(2010-1007/5R

CH7, 802.11he40, HE0, MIMO A, Range 9GHz to 18GHz -Delta Marker Measurement



Date: 9.39N3019 100500

CH7, 802.11he40, HE0, MIMO B, Range 30MHz to 9GHz -Delta Marker Measurement



Call 9.4413018 100019

CH7, 802.11he40, HE0, MIMO B, Range 18GHz to 26.5GHz - Delta Marker Measurement



B.4 Test Results BLE

B.4.1 6dB & 99% Bandwidth

Test limits

FCC part	RSS part	Limits
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

The conducted setup shown in section *Test & System Description* was used to measure the 6dB & 99% Bandwidth. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Results tables

Mode	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
	37	2402	0.667	1.16
BLE	17	2440	0.675	1.16
	39	2480	0.681	1.15

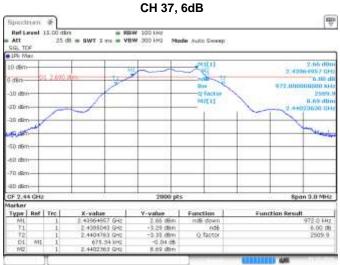


Results screenshot



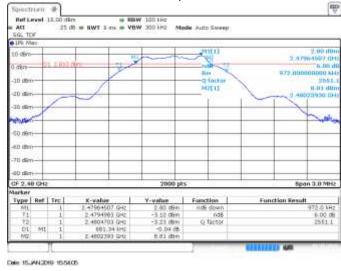


Date: 15.34N.2019 10:0454









CH 39, 6dB

m ∀ Spectrum Ref Level 15.00 dim Att 25 d8 = SWT 5 m · RBW 200 MHz 1 WH2 Mode Auto FFT TDF
 TPk: View 04.03.dt it der 2.435 a cu HIDD MH dk 10 (10) 20 dB 30 cfbr 40 dbir 50 da in di T) di iù di 3.0 M F 2.44 G 10.00 Date: 15.34N.2019 15:30:30

CH 37, 99%

CH 17, 99%



CH 39, 99%



B.4.2 Maximum Output Power and antenna gain

Test limits

	Limits
FCC Part 15.247 (b) (3)	 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.
RSS-247 Clause 5.4 (d)	For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e). As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode

Test procedure:

The Maximum peak conducted output power was measured using the $RBW \ge DTS$ bandwidth method defined in paragraph 9.1.1 of FCC KDB 558074 D01 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

The Maximum conducted average output power was measured using the channel integration method according to Method AVGSA-2, defined in paragraph 9.2.2.4 of FCC KDB 558074 D01 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power. The declared maximum antenna gain is +3.24dBi.

The conducted setup shown in section *Test & System Description* was used to measure the maximum conducted output power. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



Results tables

				Peak Power	[dBm]	
Mode	Meas. Duty Cycle [%]	СН	Frequency [MHz]	Measured Conducted Output Power	EIRP	Peak Output Power [mW]
		37	2402	8.79	12.03	7.57
BLE	60	17	2440	8.87	12.11	7.71
		39	2480	8.98	12.22	7.91

Max Value

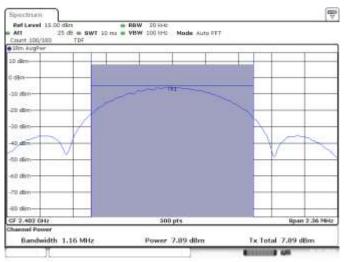
Min Value

				Average	e Output Power* [dBm]		
Mode	Meas. Duty Cycle [%]	СН	Frequency [MHz]	Maximum Conducted Output Power	Maximum Conducted Output Power Duty cycle Compensated	EIRP	Average Output Power [mW]
		37	2402	7.89	10.14	13.38	10.32
BLE	60	19	2440	7.97	10.22	13.46	10.52
		39	2480	8.10	10.35	13.59	10.84

* Output Power RMS values are shown for indicative purpose only

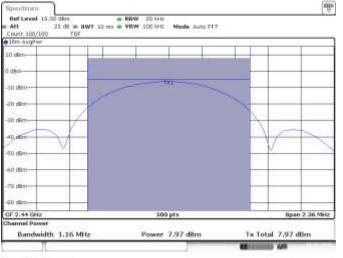


Results screenshot



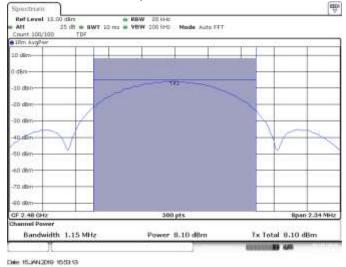
Cale: 15.JAN 2019 10/05/16



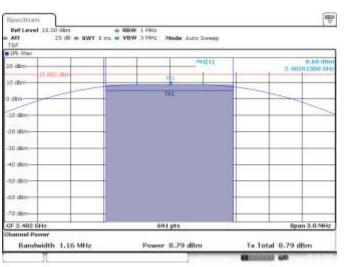


Cale: 15.3412019 153059

CH 17, Max Power RMS

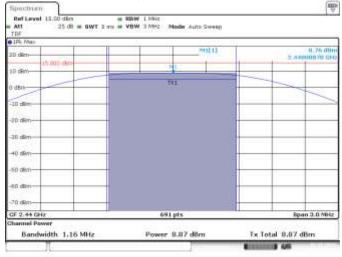






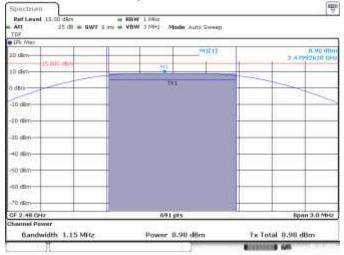
Date 15.34N2019 10/05-61

CH 37, Max Power Peak



Cale: 15.3412019 15.31.16

CH 17, Max Power Peak



Date: 15.3412010 105030

CH 39, Max Power Peak



B.4.3 Power Spectral Density

Test limits

FCC part	RSS part	Limits
15.247 (e)	RSS-247 Clause 5.2 (b)	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test procedure

The maximum peak power spectral density level of the fundamental emission was measured using the method PKPSD, defined in paragraph 10.2 of FCC KDB 558074 D01 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

The conducted setup shown in section *Test & System Description* was used to measure the power spectral density. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

The declared maximum antenna gain is +3.24dBi.

Results tables

Mode	СН	Frequency [MHz]	PSD Peak [dBm/3kHz]	PSD Peak* [dBm/100kHz]
	37	2402	-7.55	8.66
BLE	17	2440	-7.60	8.71
	39	2480	-7.17	8.90

*Note: these PSD_{Peak} values are shown just as a reference for the compliance of the Out-of-band Measurements. Thus the RBW used for these measurements was 100kHz.



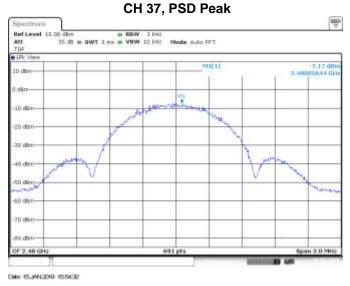
Results screenshot





CH 17, PSD Peak









B.4.4 Out-of-band emission (Conducted)

Test Limits

FCC part	RSS part			Lin	nits				
15.247 (d)	RSS-247 Clause 5.5	spectru frequen 20 dB b highest radiated	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.						
15.209	RSS-Gen Clause 8.9	The employing kHz, 11 three bar a limit s	Freq Range (MHz) 30-88 88-216 216-960 Above 960 nission limits s ing CISPR qua 0-490 kHz an ands are based rage radiated specified when	the radiated em Field Stregth (μV/m) 100 150 200 500 hown in the abo asi-peak detector d above 1000 M d on measurement emission measurement	Field Stregth (dBµV/m) 40 43.5 46 54 ve table are bas r except for the IHz. Radiated er nts employing ar ements above 1 peak detector fu	Meas. Distance (m) 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	a): ments 5 9-90 these or. s also		

Test procedure

In case of Band Edge measurements falling in restricted bands, the declared Antenna Gain is also compensated in the graph. The declared maximum antenna gain is +3.24dBi.

For Band Edge measurements falling in restricted bands, the following limits in dBm were applied for the average detector after the conversion from the limits detailed above in dB μ V/m, according to FCC 47 CFR part 15 - Subpart C – §15.209(a). The limits in dBm for peak detector are 20dB above the indicated values in the table.

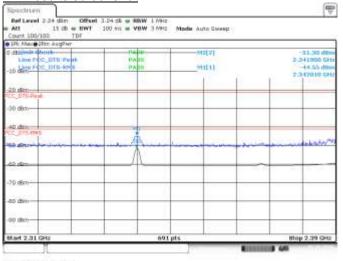
	§15.209(a)		Converted values		
Freq Range (MHz)	Distance (m)	Field strength (microvolts/meter)	Field strength (dB microvolts/meter)	Power (dBm)	
Above 960	3	500	54.0	-41.2	

The conducted setup shown in section *Test* & *System Description* was used to measure the out-of-band emissions. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Note: For the compliance of the Out-of-band Measurements, PSD_{Peak} were measured with 100kHz RBW and values are shown just as a reference in section B.4.3.

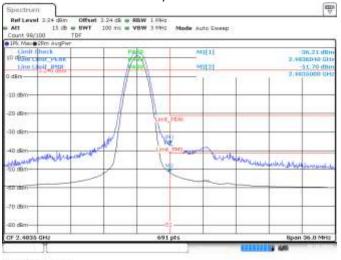


BE Results screenshot



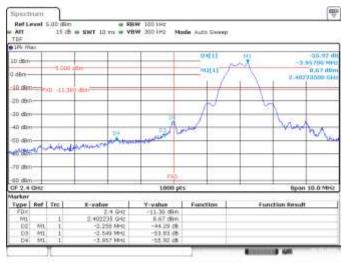


CH 37, BE Low





CH 39, BE High Restricted

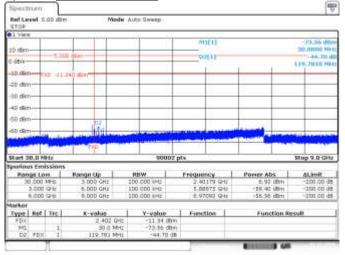


Cale: 15.34N(2010 10:01.45

CH 37, BE Low Non Restricted

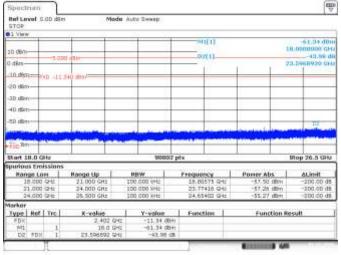


Spurious Results screenshot



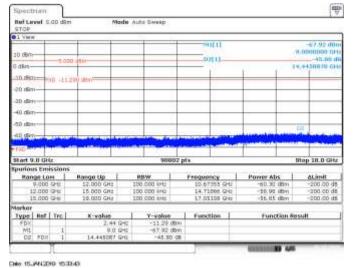
Cale: 15.JAN 2019 15/07/38



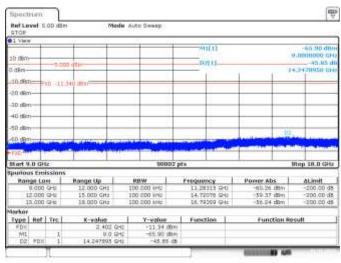


Date 15.3412019 10/08:28

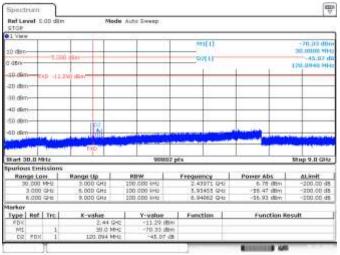
CH 37, Conducted Spurious Range 18GHz to 2GHz



CH 17, Conducted Spurious Range 9GHz to 18GHz



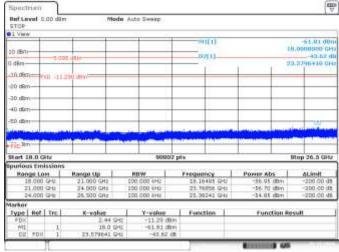
Date: 15.34N.2019 15/38/00



CH 37, Conducted Spurious Range 9GHz to 18GHz

Date 15, AN 2010 15 33 15

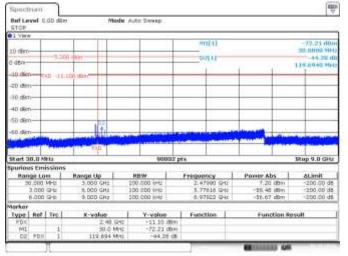
Date 15.3412010 15.3411



CH 17, Conducted Spurious Range 30MHz to 9GHz

CH 17, Conducted Spurious Range 18GHz to 2GHz





Cale: 15.JAN 2019 10.55:27



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CH 39, Conducted Spurious Range 18GHz to 2GHz

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Cale: 15.JAN 2010 15:55:55

CH 39, Conducted Spurious Range 9GHz to 18GHz



B.4.5 Radiated spurious emission

Standards references

FCC part	RSS part			Lin	nits		
			adiated emissions which fall in the restricted bands, as defined in §15.205(a), ust also comply with the radiated emission limits specified in §15.209(a):				
			Freq Range (MHz)	Field Stregth (μV/m)	Field Stregth (dBµV/m)	Meas. Distance (m)	
			30-88	100	40	3	
			88-216	150	43.5	3	
	RSS-247		216-960	200	46	3	
15.247 (d) 15.209	Clause 5.5 RSS-Gen		Above 960	500	54	3	
13.209	Clause 8.9	emplo kHz, three For a a limi	bying CISPR qua 110-490 kHz an bands are based verage radiated o t specified when	asi-peak detector d above 1000 M d on measureme emission measur	r except for the IHz. Radiated er nts employing ar ements above 10 peak detector fu	sed on measurer frequency bands mission limits in average detecto 000 MHz, there is unction, correspo	9-90 these or. s also

Test procedure

The radiated setups shown in section *Test & System Description* were used to measure the radiated spurious emissions. were used to measure the radiated spurious emissions.

Depending of the frequency range and bands being tested, different antennas and filters were used.

The final measurement is done by varying the antenna height, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

The radiated spurious emissions were measured on the lowest, middle and highest channels.

Rev. 00

Test Results

30 MHz – 26.5 GHz, BLE

Radiated Spurious – CH37

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
187.5	28.0		43.6	15.6
624.0	34.5		46.0	11.5
672.0	33.4		46.0	12.6
6325.5		45.0	54.0	9.0
6326.0	57.1		74.0	16.9
17137.7	50.8		74.0	23.2
17145.0		39.8	54.0	14.2
20719.6	47.4		74.0	26.6
20719.6		39.2	54.0	14.8

Radiated Spurious – CH17

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
80.4	29.3		40.0	10.7
187.5	29.5		43.6	14.0
624.0	34.2		46.0	11.8
6315.5		45.0	54.0	9.0
6316.0	57.3		74.0	16.7
17133.9		39.9	54.0	14.1
17168.2	51.0		74.0	23.0
20720.0	47.8		74.0	26.2
20720.0		39.8	54.0	14.2



Radiated Spurious – CH39

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
216.0	28.8		43.6	14.8
624.0	34.6		46.0	11.4
672.0	34.3		46.0	11.7
6320.5	57.3		74.0	16.7
6322.0		45.0	54.0	9.0
17134.4		39.7	54.0	14.3
17167.2	51.1		74.0	22.9
20719.6	47.3		74.0	26.7
20720.0		40.1	54.0	13.9