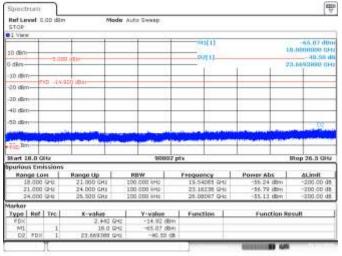


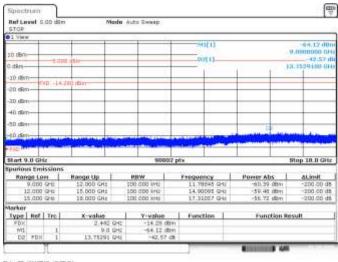
Date 22, JAN 2010 17:38:36

CH7, 802.11ax20, HE0, MIMO A, Range 30MHz to 9GHz -Delta Marker Measurement



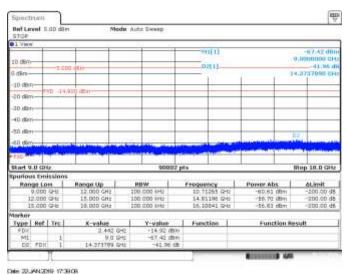
Cale 22, JAN 2010 17:39:30

CH7, 802.11ax20, HE0, MIMO A, Range 18GHz to 26.5GHz - Delta Marker Measurement

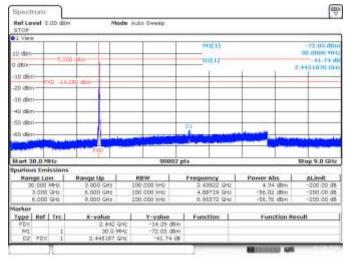


Calin 29.JAN 2019 10.23/54

CH7, 802.11ax20, HE0, MIMO B, Range 9GHz to 18GHz -Delta Marker Measurement

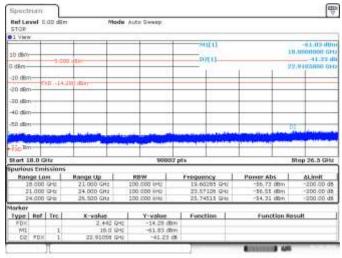


CH7, 802.11ax20, HE0, MIMO A, Range 9GHz to 18GHz -Delta Marker Measurement



Date 28.JAN 2019 15 23 08

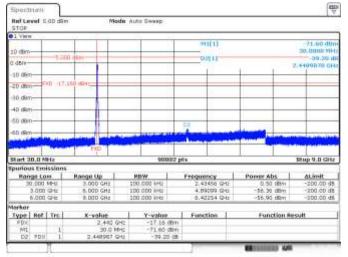
CH7, 802.11ax20, HE0, MIMO B, Range 30MHz to 9GHz -Delta Marker Measurement



Date 29.J4N 2019 15.34-40

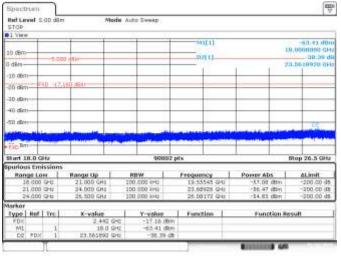
CH7, 802.11ax20, HE0, MIMO B, Range 18GHz to 26.5GHz - Delta Marker Measurement





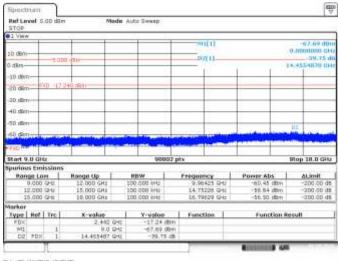
Date 23.JAN 2010 121457

CH7, 802.11ax40, HE0, SISO A, Range 30MHz to 9GHz -Delta Marker Measurement



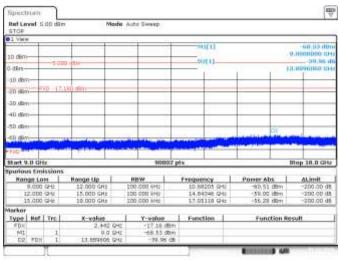
Cale 23.JAN 2019 12 15 05

CH7, 802.11ax40, HE0, SISO A, Range 18GHz to 26.5GHz -Delta Marker Measurement



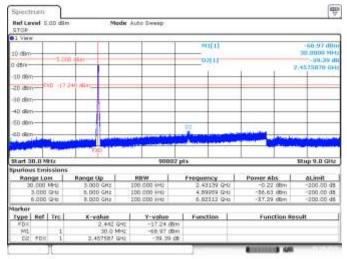
Caller 20.344 2010 18:20:20

CH7, 802.11ax40, HE0, SISO B, Range 9GHz to 18GHz -Delta Marker Measurement



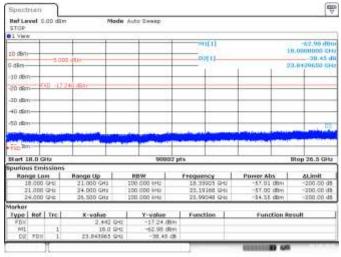
Date 23.JAN 2019 121526

CH7, 802.11ax40, HE0, SISO A, Range 9GHz to 18GHz -Delta Marker Measurement



Date 29.JAN 2019 18:28:27

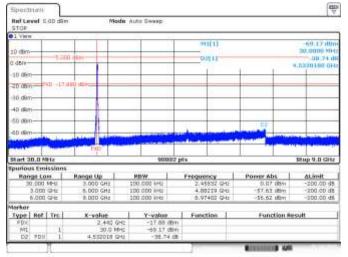
CH7, 802.11ax40, HE0, SISO B, Range 30MHz to 9GHz -Delta Marker Measurement



Date 28.JAN 2019 18:30-12

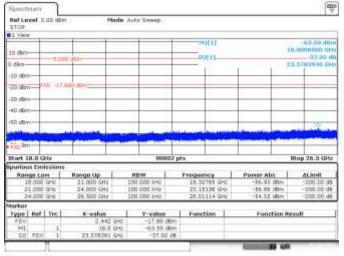
CH7, 802.11ax40, HE0, SISO B, Range 18GHz to 26.5GHz -Delta Marker Measurement





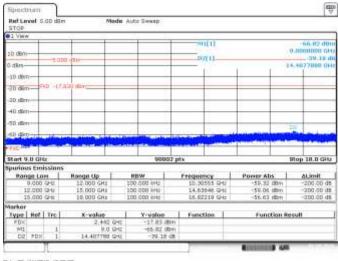
Cate 23.JAN 2010 10:52.45

CH7, 802.11ax40, HE0, MIMO A, Range 30MHz to 9GHz -Delta Marker Measurement



Date 23.JAN 2010 1053.44

CH7, 802.11ax40, HE0, MIMO A, Range 18GHz to 26.5GHz - Delta Marker Measurement



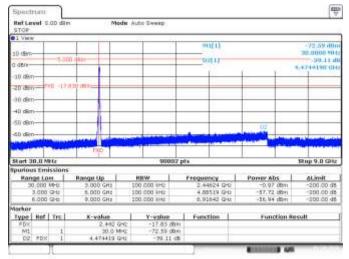
Callin 28.JAN 2019 19:20:22

CH7, 802.11ax40, HE0, MIMO B, Range 9GHz to 18GHz -Delta Marker Measurement

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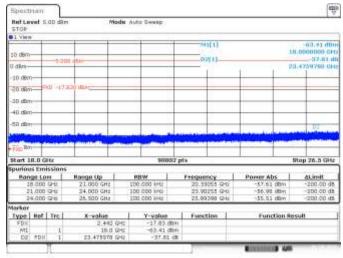
Caller 23., AN 2010 1053-16

CH7, 802.11ax40, HE0, MIMO A, Range 9GHz to 18GHz -Delta Marker Measurement



Date 28.JAN 2010 19 19 29

CH7, 802.11ax40, HE0, MIMO B, Range 30MHz to 9GHz -Delta Marker Measurement



Date 28.JAN 2019 19:21:15

CH7, 802.11ax40, HE0, MIMO B, Range 18GHz to 26.5GHz - Delta Marker Measurement



Annex C. Test Results BLE

C.1 Test Results BLE

C.1.1 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

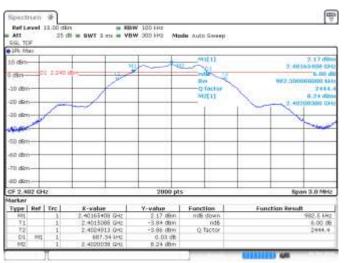
The conducted setup shown in section *Test & System Description* was used to measure the 6dB & 99% Bandwidth. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Results tables

Mode	Channel	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
	37	2402	0.69	1.17
BLE	17	2440	0.68	1.16
	39	2480	0.68	1.15



Results screenshot





Date: 4 FEB 2019 17.4713





Date: 4 FEB.2019 17:51:49



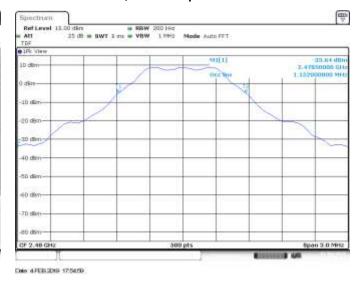


CH 39, 6dB Occupied Bandwidth





CH 17, 99% Occupied Bandwidth



CH 39, 99% Occupied Bandwidth

C.1.2 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 [%]	CH Frequency [MHz]		Measured Conducted Output Power	EIRP	Peak Output Power [mW]
		37	2402	8.53	11.77	7.13
BLE	61	17	2440	8.72	11.96	7.45
		39	2480	8.91	12.15	7.78

Max Value

Min Value

				Average	e Output Power* [dBm]		
Mode			Frequency [MHz]	Maximum Conducted Output Power	Maximum Conducted Output Power Duty cycle Compensated	EIRP	Average Output Power [mW]
		37	2402	6.20	8.34	11.58	6.83
BLE	61	17	2440	6.45	8.59	11.83	7.23
		39	2480	6.66	8.80	12.04	7.59

* Output Power RMS values are shown for indicative purpose only



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8.60 d0/ 91740 GH

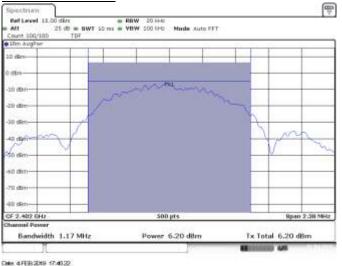
Bpan 3.0 MHz

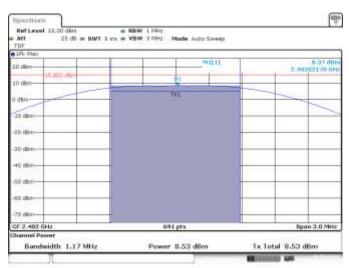
Tx Total 8.72 dBm

2.44

Test Report Nº 181210-02.TR04

Results screenshot





Date: 4 FEB 2019 17.4645

 Ref Level
 15.00 dBm
 # RBW

 Att
 25.08 # SWT 5 m # VBW

15 200 eB

Spectrum

IPk Max

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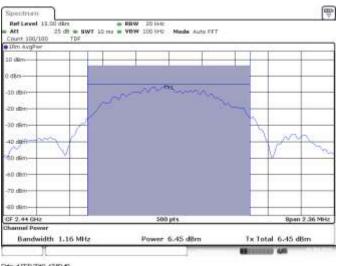
10 d

CF 2.44 GHz



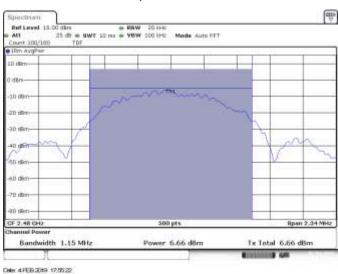
Auto Sweep

1 MHz



Date: 4 FEB 2019 17:50.46

CH 17, Max Power RMS



CH 39, Max Power RMS

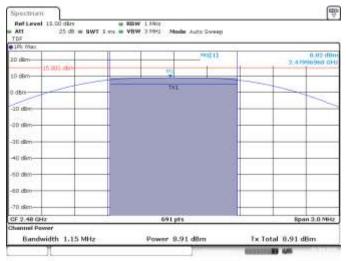
Bandwidth 1.16 MHz

Date: 4 FEB 2019 17:51:10

CH 17, Max Power Peak

691 pts

Power 8.72 dBm



Date: 4 FEB.2019 17:55:45

CH 39, Max Power Peak

CH 37, Max Power RMS



C.1.3 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.

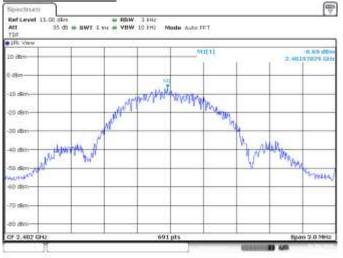
Results tables

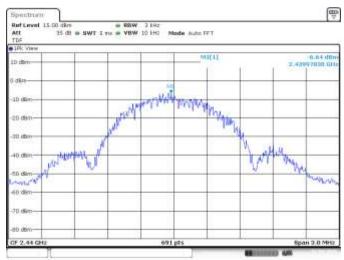
Mode	СН	Frequency [MHz]	PSD Peak [dBm/3kHz]	PSD Peak* [dBm/100kHz]
	37	2402	-6.69	8.27
BLE	17	2440	-6.64	8.48
	39	2480	-6.71	8.74

*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





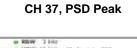
Cale: 4 FEB 2019 17:52:10

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CH 17, PSD Peak



Spectrum





CH 39, PSD Peak



C.1.4 Out-of-band emission (Conducted)

Test Limits

FCC part	RSS part			Lin	nits					
15.247 (d)	RSS-247 Clause 5.5	spect freque 20 dE highe radiat	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. Radiated emissions which fall in the restricted bands, as defined in §15.205(a),							
15.209	RSS-Gen Clause 8.9	The e emplo kHz, three For a a limi	also comply with Freq Range (MHz) 30-88 88-216 216-960 Above 960 Pemission limits sl bying CISPR qua 110-490 kHz an bands are based verage radiated et t specified when	the radiated emi 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 rements 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 s 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.

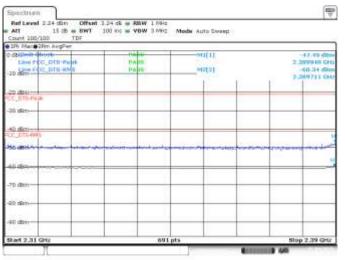
	§15.209(a)		Converted v	alues
Freq Range (MHz)	Distance (m)	Field strength (microvolts/meter)	Field strength (dB microvolts/meter)	Power (dBm)
Above 960	3	500	54.0	-41.2

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 C.1.3.



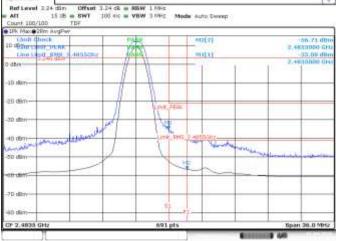
BE Results screenshot



Cate: 4.FEB.2019 17:38:17

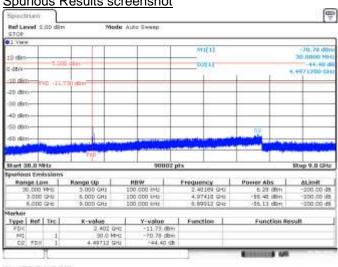
Spectrum





Cala: 4.FEB.2019 17:40:22

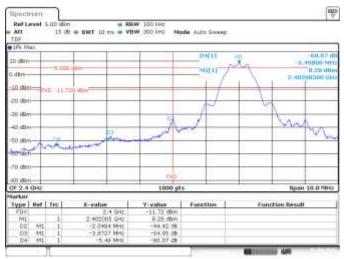




Spurious Results screenshot

Cale: 4 FEB 2019 17.48:30

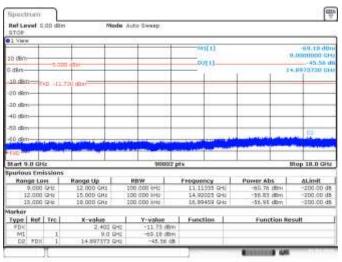
CH 37, Conducted Spurious Range 30MHz to 9GHz - Delta Marker Measurement



Date: 4 FEB 2019 17:39:29

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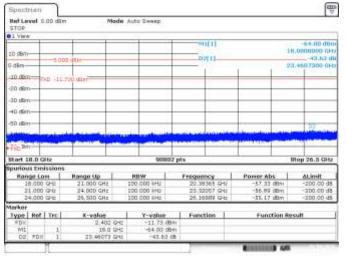
CH 37, BE Low Non Restricted



Date: 4 FEB 2019 17.49(0)

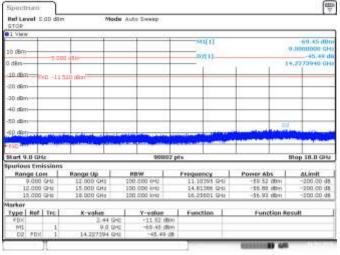
CH 37, Conducted Spurious Range 9GHz to 18GHz - Delta **Marker Measurement**





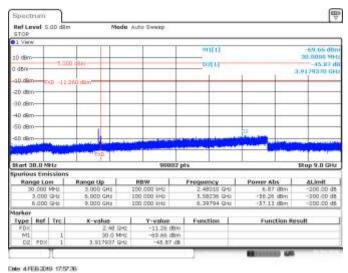
Date: 4 FEB 2019 17.49.28

CH 37, Conducted Spurious Range 18GHz to 26.5GHz -Delta Marker Measurement

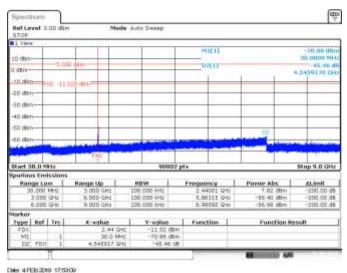


Date: 4 FEB.2019 17:50.38

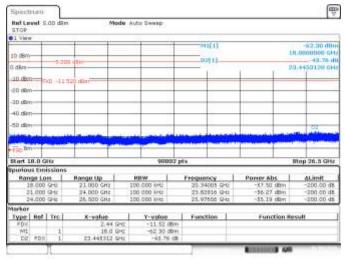
CH 17, Conducted Spurious Range 9GHz to 18GHz - Delta Marker Measurement



CH 39, Conducted Spurious Range 30MHz to 9GHz - Delta Marker Measurement

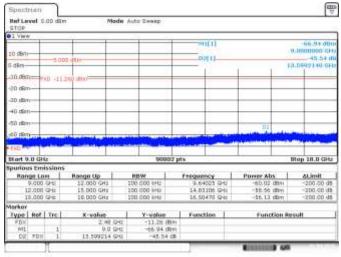


CH 17, Conducted Spurious Range 30MHz to 9GHz - Delta Marker Measurement



Date: 4 FEB.2019 17.5408

CH 17, Conducted Spurious Range 18GHz to - Delta Marker Measurement 26.5GHz



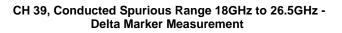
Date: 4 FEB 2019 17:59:05

CH 39, Conducted Spurious Range 9GHz to 18GHz - Delta Marker Measurement



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Fito Ba										
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Fic In Skart I Spuriou	II.0 G	issions								1910 p 26.5 GHz
Fix Br Skart 1 Spurior Ran	18.0 G	issions	Range Up		RBW	Fre	quercy		er Abs	Blop 26.5 GHz ALimit
FRE Br Skart 1 Spuriou Ran 1	18.0 G	issions H GHL	21.000 Gł		PBW 100.000 EHE	FN	20.29865 GH	1 -	87,47 illm	Bhop 26.5 GHz ALimit -200.00 48
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Rort I Skort I Spuriou Bon 1 2 Markor	8.000 1.000 4.000	9-U 9-U 9-U 9-U	21.000 G/ 34.000 G/	12	HBW 100.000 HH2 100.000 kH2	Fre	20.29863 GH 22.48400 GH		57,47 (Bm 16.34 (Bm	Btop 26.5 GHz <u>ALimit</u> -200.00 dB -200.00 dB -200.00 dB
BRart 1 Spuriou Ban 1 2 2	8.000 1.000 4.000	9-U 9-U 9-U 9-U	21.000 G/ 34.000 G/ 26.500 G/ K-value	12	HIW 200.000 6H2 100.000 8H2 200.000 8H2	Fre	20,29863,04 22,48400,04 25,05456,124		57,47 (Bm 96.54 (Bm 54,94 (Bm	Btop 26.5 GHz <u>ALimit</u> -200.00 dB -200.00 dB -200.00 dB

Cale: 4/FEB.2019 17:59.34





C.1.5 Radiated spurious emission

Standards references

FCC part	RSS part			Lin	nits		
				hich fall in the res the radiated em			
			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	
15.209	Clause 8.9	emple kHz, three For a a limi	bying CISPR qua 110-490 kHz an bands are based verage radiated of t specified when	hown in the abo asi-peak detector d above 1000 M d on measuremen emission measur measuring with dicated values in	r except for the IHz. Radiated en nts employing ar ements above 1 peak detector fu	frequency bands mission limits in average detecto 000 MHz, there is	s 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
408.0	31.8		46.0	14.2
576.0	31.2		46.0	14.8
6320.5	57.2		74.0	16.8
6321.5		44.6	54.0	9.4
7001.8	47.3		74.0	26.7
7052.0		35.9	54.0	18.1
17132.4	51.4		74.0	22.6
17142.1		40.1	54.0	13.9
21999.7	47.4		74.0	26.6
22000.1		40.6	54.0	13.4

Radiated Spurious – CH17

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
407.7	31.2		46.0	14.8
576.0	30.3		46.0	15.7
6321.0		44.9	54.0	9.1
6322.5	56.8		74.0	17.2
6992.6	48.0		74.0	26.0
7001.3		36.0	54.0	18.0
22000.1		39.4	54.0	14.6
22018.8	47.0		74.0	27.0



Radiated Spurious – CH39

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBµV/m	dBµV/m	dBµV/m	dB
407.7	31.9		46.0	14.1
576.0	29.7		46.0	16.3
6353.5	56.1		74.0	17.9
6355.5		43.9	54.0	10.1
10129.4		36.3	54.0	17.7
17814.4		39.1	54.0	14.9
17827.9	50.1		74.0	23.9
22000.1	47.1		74.0	26.9
22000.1		40.6	54.0	13.4