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# Wireless Test Report – 387256-9R1TRFWL

Applicant:

**Ring LLC**

Product name:

**Ring**

Model:

**4HB1V9**

FCC ID:

**2AEUPBHABV002**

Specifications:

## **FCC 47 CFR Part 15 Subpart C, §15.247**

Intentional Radiators – Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz

## **FCC 47 CFR Part 15 Subpart C, §15.249**

Intentional Radiators – Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz

## **FCC 47 CFR Part 15 Subpart E, §15.407**

Unlicensed National Information Infrastructure Devices – General technical requirements

## **FCC 47 CFR Part 22 Subpart C, §22.359**

Public Mobile Services – Operational and Technical Requirements – Emission limitations

Date of issue: **July 7, 2020**

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Test engineer(s)

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Reviewed by

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[www.nemko.com](http://www.nemko.com)

Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada. The tests included in this report are within the scope of this accreditation



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Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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## Section 1. Report summary

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### 1.1 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
FCC 47 CFR Part 15, Subpart C, Clause 15.249	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz
FCC 47 CFR Part 15, Subpart E, Clause 15.407	Unlicensed National Information Infrastructure Devices – General technical requirements
FCC 47 CFR Part 22, Subpart C, Clause 22.359	Public Mobile Services – Operational and Technical Requirements – Emission limitations

### 1.2 Test methods

789033 D02 General UNII Test Procedures New Rules v02r01 (December 14, 2017)	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
662911 D01 Multiple Transmitter Output v02r01 (October 31, 2013)	Emissions Testing of Transmitters with Multiple Outputs in the Same Band
558074 D01 15.247 Meas Guidance v05r02 (April 2, 2019)	Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.
ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

### 1.3 Exclusions

The EUT was assessed for radiated emissions as a verification with multiple transmitters enabled at the same time to ensure compliance was maintained.

### 1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard or as per detailed in the section 1.3 Exclusions above. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

### 1.5 Test report revision history

**Table 1.5-1: Test report revision history**

Revision #	Date of issue	Details of changes made to test report
TRF	November 27, 2019	Original report issued
R1TRF	July 7, 2020	Updated product model and description/theory of operation

## Section 2. Summary of test results

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### 2.1 Testing period

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Test start date	November 19, 2019
Test end date	November 20, 2019

### 2.2 FCC test results

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*Table 2.2-1: Result summary*

Part	Section	Test description	Verdict
\$15.247	d	Unwanted emissions (Radiated)	Pass
\$15.249	d	Spurious emissions (except harmonics)	Pass
\$15.407	(b)(1)	Undesirable emission limits (Operating in the band 5.15–5.25 GHz)	Pass
\$22.359	(a)	Out of band emissions	Pass

Notes:

- The EUT was only assessed for the radiated emissions. No conducted measurements were performed.
- Only emissions that were a product of multiple transmitters enabled were verified for continued compliance.

## Section 3. Equipment under test (EUT) details

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### 3.1 Applicant and manufacturer

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Company name	Ring LLC
Address	1523 26 <sup>th</sup> Street, Santa Monica, CA, United States, 90404

### 3.2 Sample information

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Receipt date	October 16, 2019
Nemko sample ID number	Item # 2

### 3.3 EUT information

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Product name	Ring
Model	4HB1V9
Serial number	BHBV21931PG001894

### 3.4 Technical information

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**Table 3.4-1: Antenna information**

LTE Antenna	Antenna type	Band 2 peak gain (dBi)	Band 4 peak gain (dBi)	Band 5 peak Gain (dBi)	Band 12,13 peak gain (dBi)
Main	Monopole	2.96	3.2	0.93	0.93
Diversity	Monopole	3.14	2.41	-2.15	-2.15
Tri-Band Antenna	Antenna type	2.4 GHz Band peak gain, dBi	5 GHz Band peak gain, dBi	900 MHz Band peak gain, dBi	
Wi-Fi / BLE 2.4GHz	Inverted F	3.96	—	—	—
Wi-Fi 5GHz	Inverted F	—	2.35	—	—
SimpleLink (TI1310)	Inverted F	—	—	—	0.56
Dual Band Antenna	Antenna type	900 MHz Band peak gain, dBi	2.4 GHz Band peak gain, dBi		
Z-Wave	Monopole	1.3	—	—	—
ZigBee	Monopole	—	4.4	—	—

Notes: None

### 3.5 Co-location test plan

*Table 3.5-1: Co-Location configurations*

Radio module device	Radio parameters
<b>Configuration 1: LTE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
LTE	Middle Channel: Band 2 (1880 MHz)
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 2: LTE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
LTE	Middle Channel: Band 4 (1732.5 MHz)
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 3: LTE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
LTE	Middle Channel: Band 5 (836.5 MHz)
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 4: LTE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
LTE	Middle Channel: Band 12 (707.5 MHz)
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 5: LTE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
LTE	Middle Channel: Band 13 (782 MHz)
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 6: BLE + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
BLE	Low Channel 00: 2402 MHz
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 7: Wi-Fi (2.4 GHz band) + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
Wi-Fi (2.4 GHz band)	Low Channel 01: 2412 MHz
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz
<b>Configuration 8: Wi-Fi (5 GHz band) + ZigBee + Z-Wave + SimpleLink (TI1310)</b>	
Wi-Fi (UNI band)	Low Channel 36: 5180 MHz
ZigBee	Low Channel 11: 2405 MHz
Z-Wave	High Channel 916 MHz
SimpleLink (TI1310)	High Channel 927.8 MHz

Notes: None

### 3.6 Product description and theory of operation

Communications device using LTE, BLE, Wi-Fi, ZigBee, Z-Wave, and SimpleLink (TI1310) technologies.

### 3.7 EUT exercise details

The EUT was setup in continuous transmit state.

During the test, power setting was set as below:

Radio	Power setting
LTE	100
BLE	16
ZigBee	195
Z-Wave	31
SimpleLink (TI1310)	14
Wi-Fi (2.4 GHz band)	18
Wi-Fi (UNI band)	16

### 3.8 EUT setup diagram

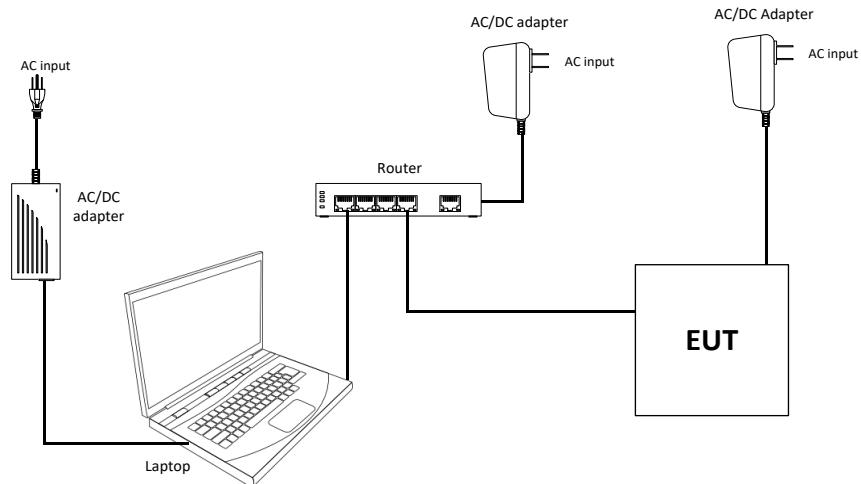


Figure 3.8-1: Setup diagram

### 3.9 EUT sub assemblies

Table 3.9-1: EUT sub assemblies

Description	Brand name	Model/Part number	Serial number
AC/DC Adapter	Ring	DSA-13PFG-05 050250	BHAB11930DV046916
Laptop	Dell	Inspiron 15	DW78NJ2
Router	D-Link	DIR-822	RZSC3IA001646

## Section 4. Engineering considerations

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### 4.1 Modifications incorporated in the EUT for compliance

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There were no modifications performed to the EUT during this assessment.

### 4.2 Technical judgment

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None

### 4.3 Deviations from laboratory tests procedures

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No deviations were made from laboratory procedures.

## Section 5. Test conditions

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### 5.1 Atmospheric conditions

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Temperature	15–30 °C
Relative humidity	20–75 %
Air pressure	86–106 kPa

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

### 5.2 Power supply range

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The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages  $\pm 5\%$ , for which the equipment was designed.

## Section 6. Measurement uncertainty

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### 6.1 Uncertainty of measurement

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UKAS Lab 34 and TIA-603-B have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada, Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products.

Measurement uncertainty budgets for the tests are detailed below. Measurement uncertainty calculations assume a coverage factor of  $K = 2$  with 95% certainty.

Test name	Measurement uncertainty, dB
Radiated spurious emissions	3.78

## Section 7. Test equipment

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### 7.1 Test equipment list

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**Table 7.1-1: Equipment list**

Equipment	Manufacturer	Model no.	Asset no.	Cal./Ver. cycle	Next cal./ver.
3 m EMI test chamber	TDK	SAC-3	FA003012	1 year	Oct. 10/20
Flush mount turntable	SUNAR	FM2022	FA003006	—	NCR
Controller	SUNAR	SC110V	FA002976	—	NCR
Antenna mast	SUNAR	TLT2	FA003007	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESR26	FA002969	1 year	June 04/20
Horn antenna (1–18 GHz)	ETS-Lindgren	3117	FA002911	1 year	Sept. 11/20
Preamp (1–18 GHz)	ETS-Lindgren	124334	FA002956	1 year	Sept. 26/20
Bilog antenna (30–2000 MHz)	SUNAR	JB1	FA003010	1 year	Sept. 17/20
50 Ω coax cable	Huber + Suhner	None	FA003047	1 year	Sept 30/20
50 Ω coax cable	Huber + Suhner	None	FA003044	1 year	Oct. 7/20
Filter 2.4 – 2.4835 GHz	Microwave Circuits	N0324413	FA003027	1 year	Oct. 8/20
High Pass Filter 3 – 18 GHz	Microwave Circuits	H3G020G8	FA003026	1 year	Oct. 8/20
Filter 902 – 928 MHz	Microwave Circuits	N03916M1	FA003032	1 year	Oct. 9/20
Filter 5.15 – 5.35 GHz	Microwave Circuits	N0452501	FA003030	1 year	Oct. 9/20

Notes: NCR - no calibration required, VOU - verify on use

## Section 8. Testing data

### 8.1 Spurious emissions caused by co-located transmitters

#### 8.1.1 Definitions and limits

**FCC §15.247 (d):**

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

**FCC §15.249 (d):**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**FCC §15.407 (b):**

- (1) 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  $-27 \text{ dBm/MHz}$ .
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.
- (7) The provisions of § 15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

**FCC §22.359 (a)**

*Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P) \text{ dB}$ .

**Table 8.1-1: FCC §15.209 Radiated emission limits**

Frequency, MHz	Field strength of emissions		Measurement distance, m
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.

For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

### 8.1.1 Definitions and limits, continued

**Table 8.1-2: FCC restricted frequency bands**

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

Notes: None

### 8.1.2 Test date

Start date November 19, 2019

### 8.1.3 Observations, settings and special notes

- The spectrum was searched from 30 MHz to 18 GHz.
- The spectral plots have been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators).
- Radiated measurements were performed at a distance of 3 m
- Emissions detected within restricted bands that were close to the limit were found to be digital emissions.

Spectrum analyzer settings for radiated measurements below 1 GHz:

Detector mode	Peak
Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Trace mode	Max Hold

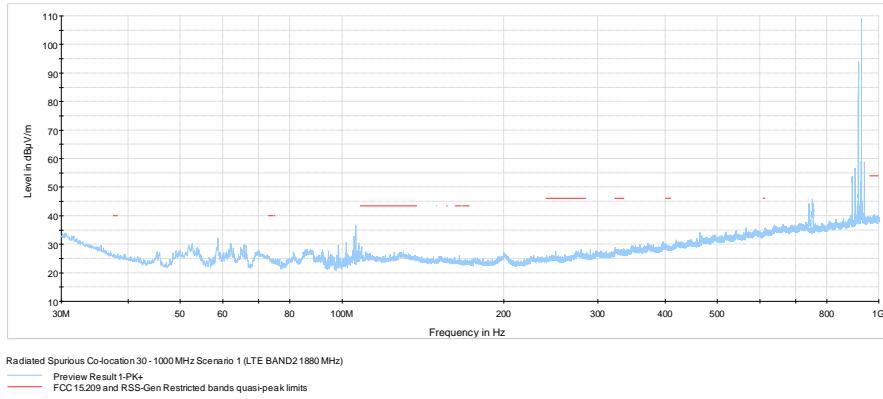
Spectrum analyser settings for peak radiated measurements above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

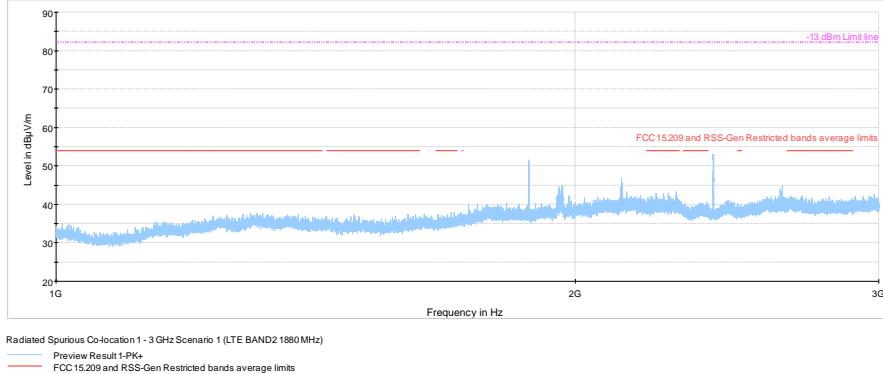
Spectrum analyser settings for average radiated measurements in restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	RMS
Trace mode:	Average (100 counts)

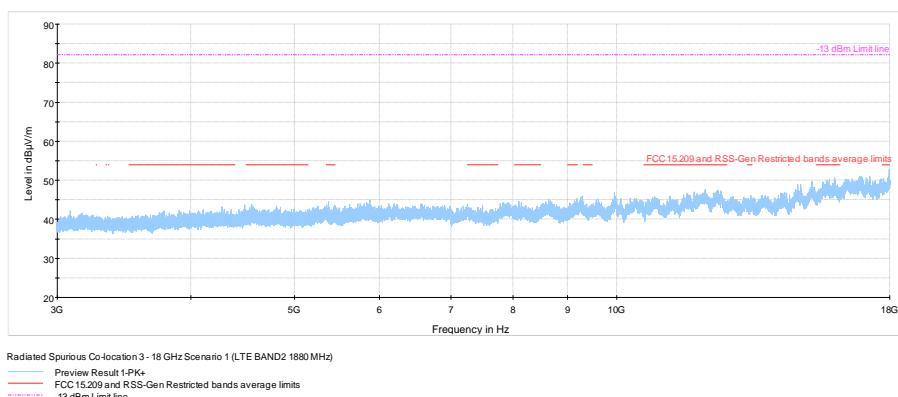
#### 8.1.4 Test data



**Figure 8.1-1:** Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 1 (LTE Band 2)

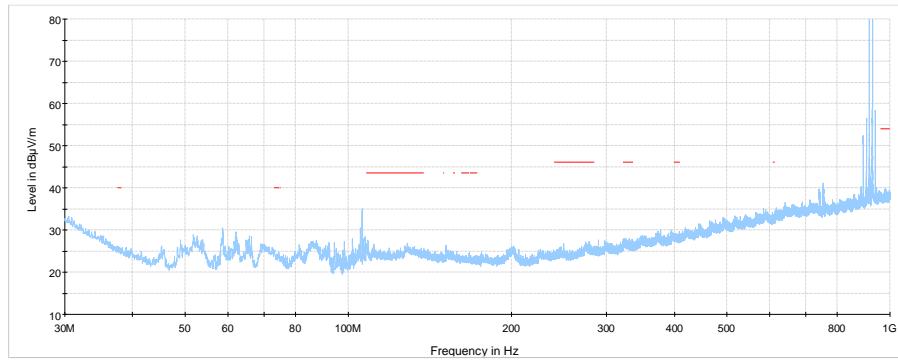


**Figure 8.1-2:** Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 1 (LTE Band 2)



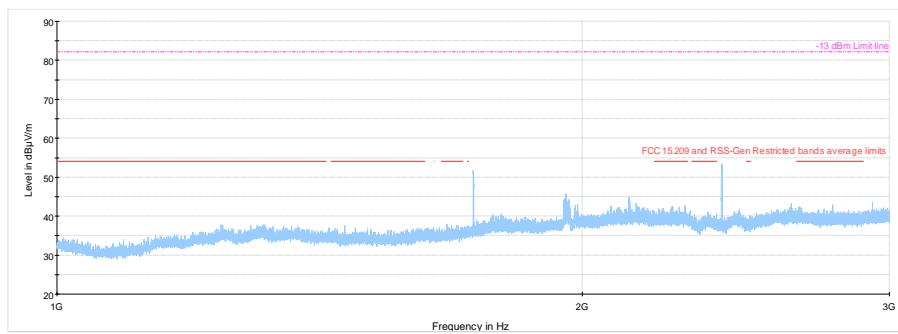
**Figure 8.1-3:** Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 1 (LTE Band 2)

#### 8.1.4 Test data, continued



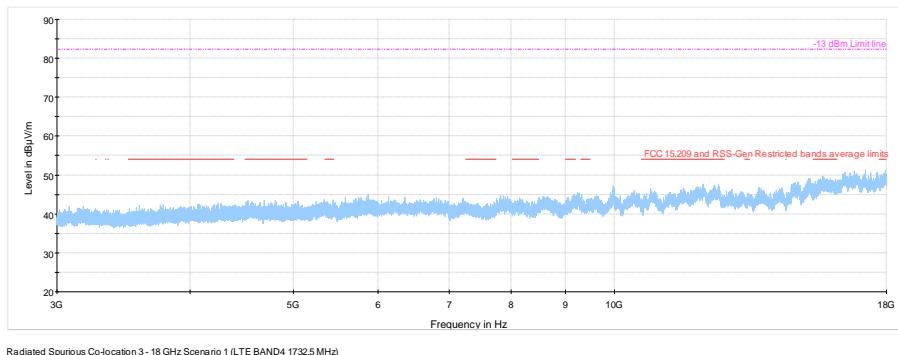
Radiated Spurious Co-location 30 - 1000 MHz Scenario 1 (LTE BAND4 1732.5 MHz)  
Preview Result 1-PK+  
FCC 15.209 and RSS-Gen Restricted bands quasi-peak limits

**Figure 8.1-4: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 2 (LTE Band 4)**



Radiated Spurious Co-location 1 - 3 GHz Scenario 1 (LTE BAND4 1732.5 MHz)  
Preview Result 1-PK+  
FCC 15.209 and RSS-Gen Restricted bands average limits  
-13 dBm Limit line

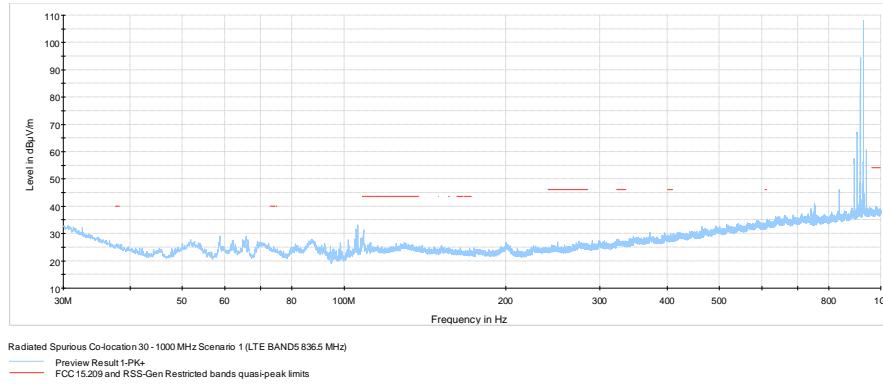
**Figure 8.1-5: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 2 (LTE Band 4)**



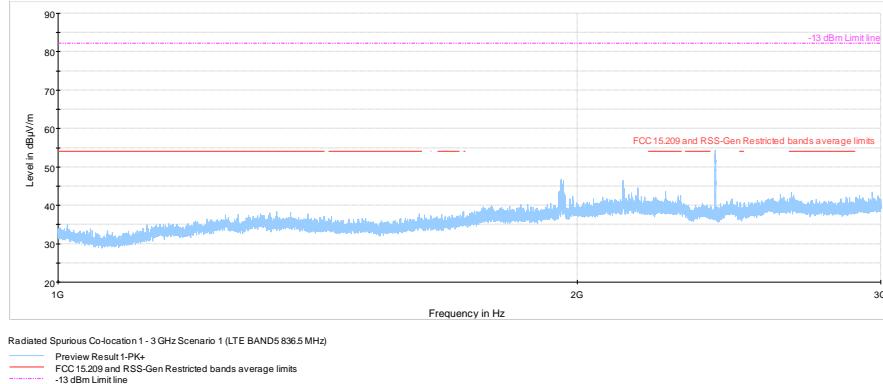
Radiated Spurious Co-location 3 - 18 GHz Scenario 1 (LTE BAND4 1732.5 MHz)  
Preview Result 1-PK+  
FCC 15.209 and RSS-Gen Restricted bands average limits  
-13 dBm Limit line

**Figure 8.1-6: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 2 (LTE Band 4)**

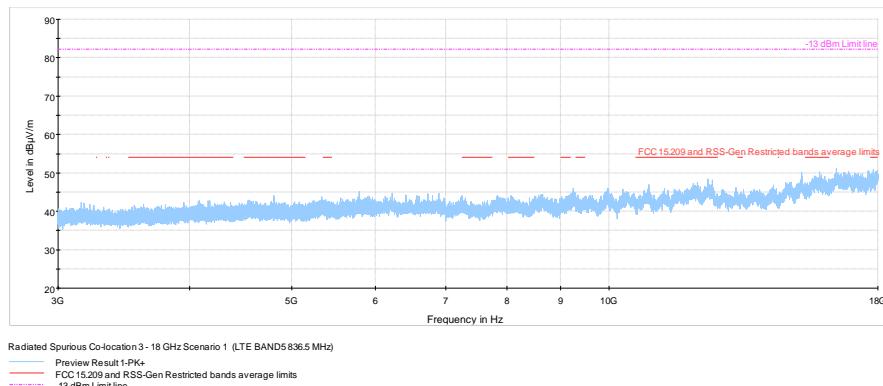
#### 8.1.4 Test data, continued



**Figure 8.1-7: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 3 (LTE Band 5)**

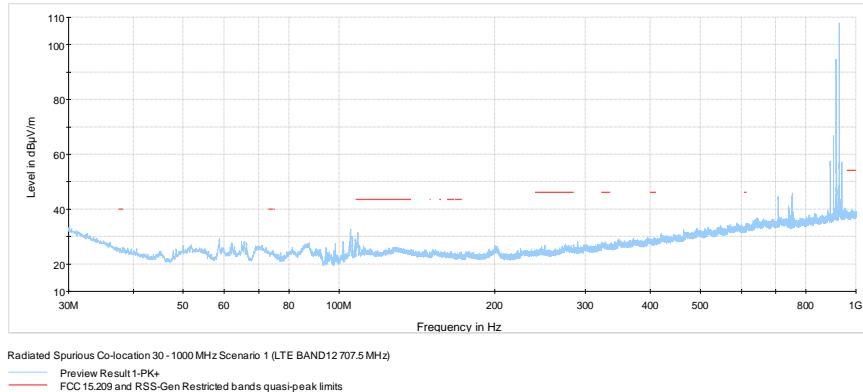


**Figure 8.1-8: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 3 (LTE Band 5)**

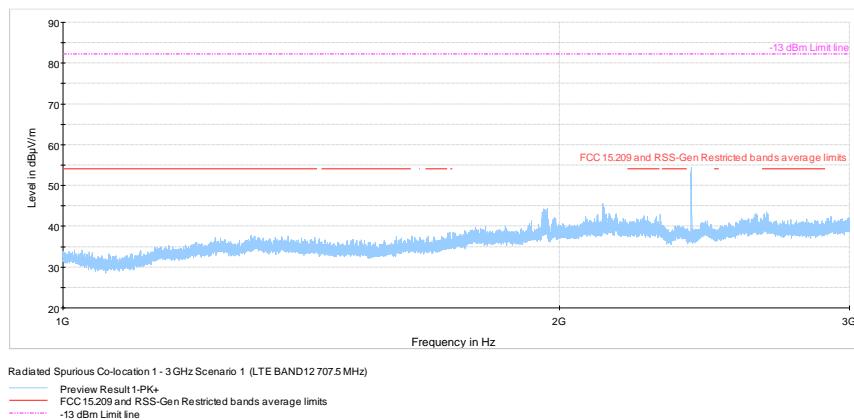


**Figure 8.1-9: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 3 (LTE Band 5)**

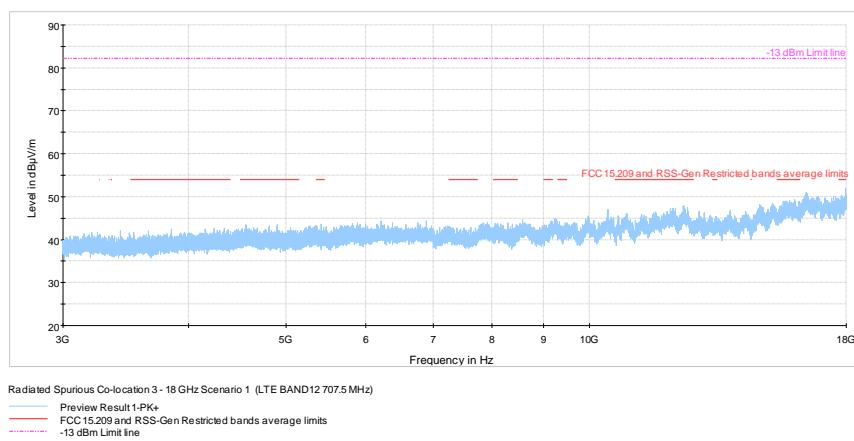
#### 8.1.4 Test data, continued



**Figure 8.1-10: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 4 (LTE Band 12)**

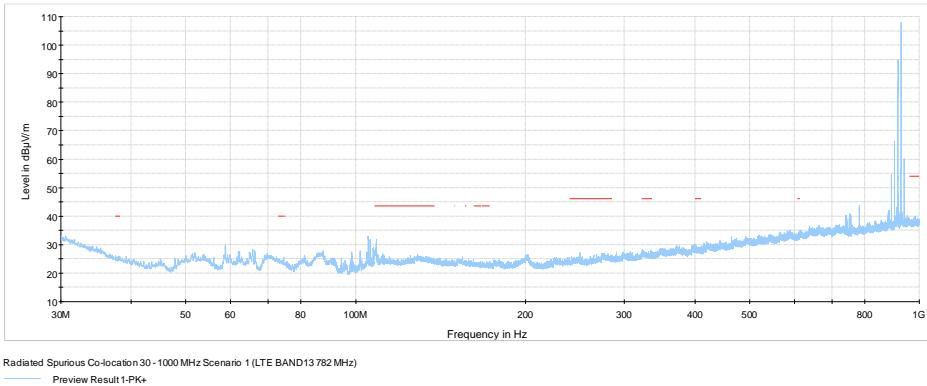


**Figure 8.1-11: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 4 (LTE Band 12)**

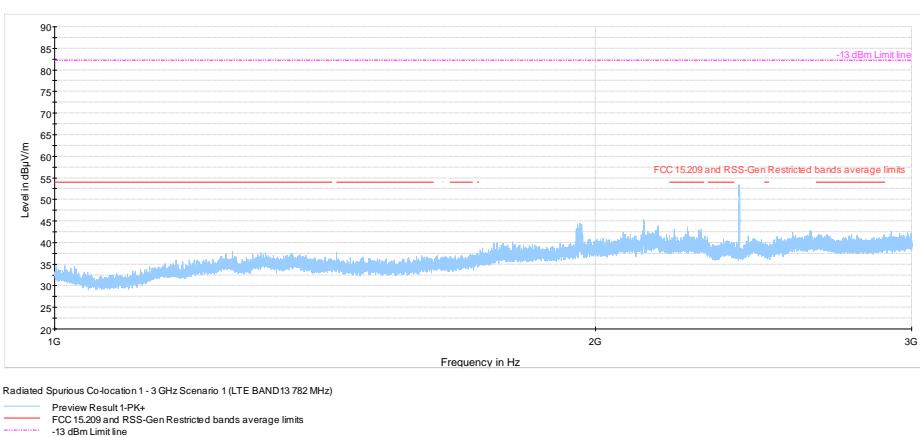


**Figure 8.1-12: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 4 (LTE Band 12)**

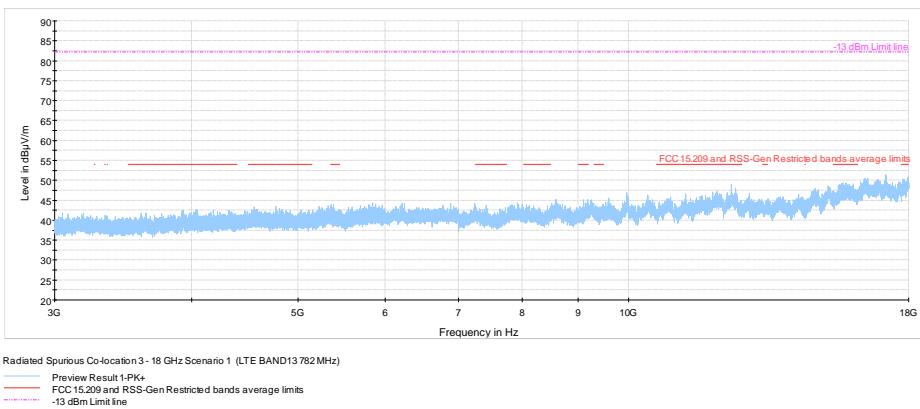
#### 8.1.4 Test data, continued



**Figure 8.1-13:** Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 5 (LTE Band 13)



**Figure 8.1-14:** Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 5 (LTE Band 13)



**Figure 8.1-15:** Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 5 (LTE Band 13)

**Section 8**  
**Test name**  
**Specification**

Testing data  
Radiated spurious emissions products from co-located transmitters  
FCC part 15 subpart C, subpart E and FCC part 22 subpart C

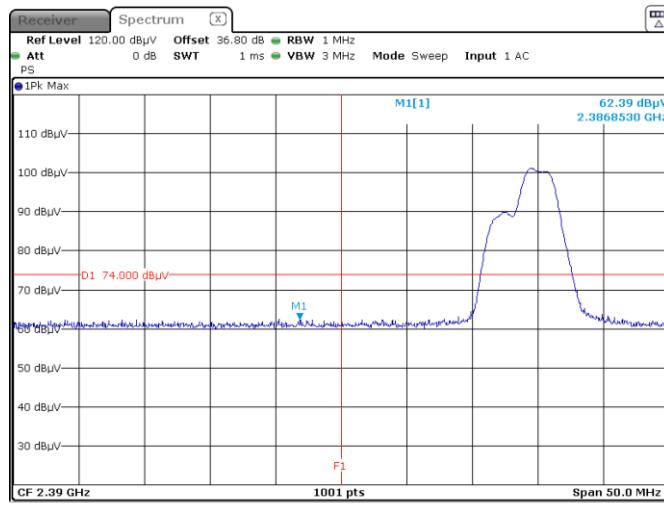


#### 8.1.4 Test data, continued

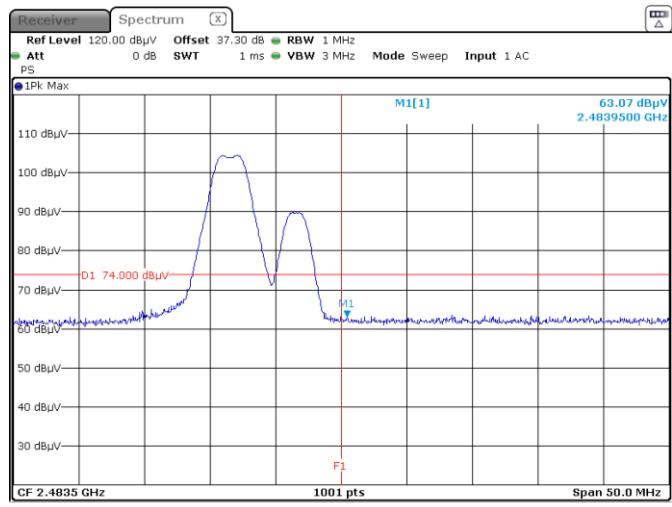
**Table 8.1-3: Radiated field strength measurement results for BLE and ZigBee**

Channel	Frequency, MHz	Peak Field strength, dB $\mu$ V/m		Margin, dB	Average Field strength, dB $\mu$ V/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	2390	62.4	74.0	11.6	40.5	54.0	13.5
High	2483.5	63.1	74.0	10.9	44.1	54.0	9.9

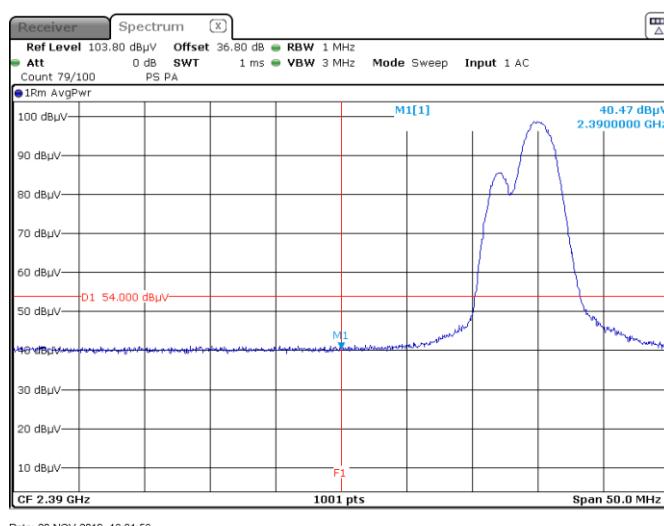
Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.



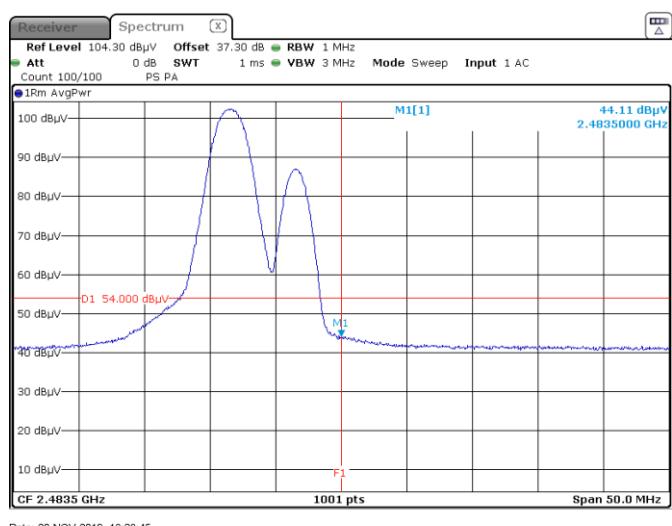
**Figure 8.1-16: Lower band edge, Configuration 6 (BLE low Channel and ZigBee low Channel) Peak detector**



**Figure 8.1-17: Upper band edge, Configuration 6 (BLE high Channel and ZigBee high Channel) Peak detector**



**Figure 8.1-18: Lower band edge, Configuration 6 (BLE low Channel and ZigBee low Channel) Average detector**



**Figure 8.1-19: Upper band edge, Configuration 6 (BLE high Channel and ZigBee high Channel) Average detector**

#### 8.1.4 Test data, continued

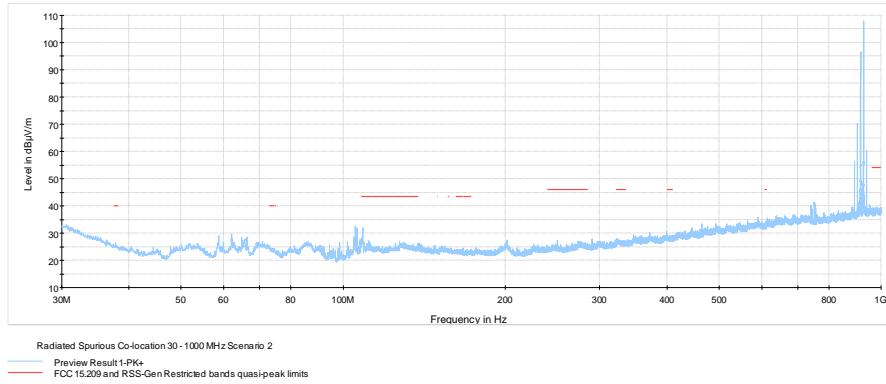


Figure 8.1-20: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 6

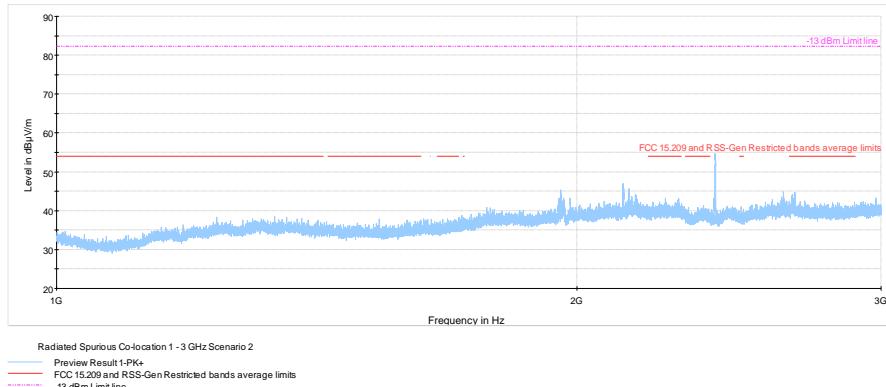


Figure 8.1-21: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 6

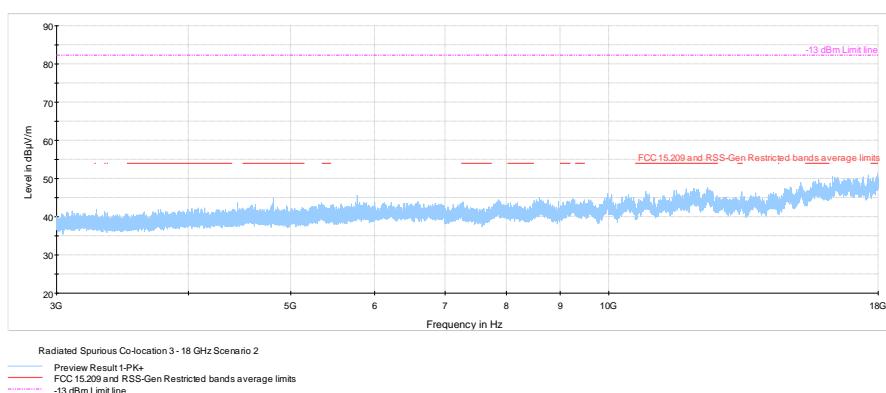
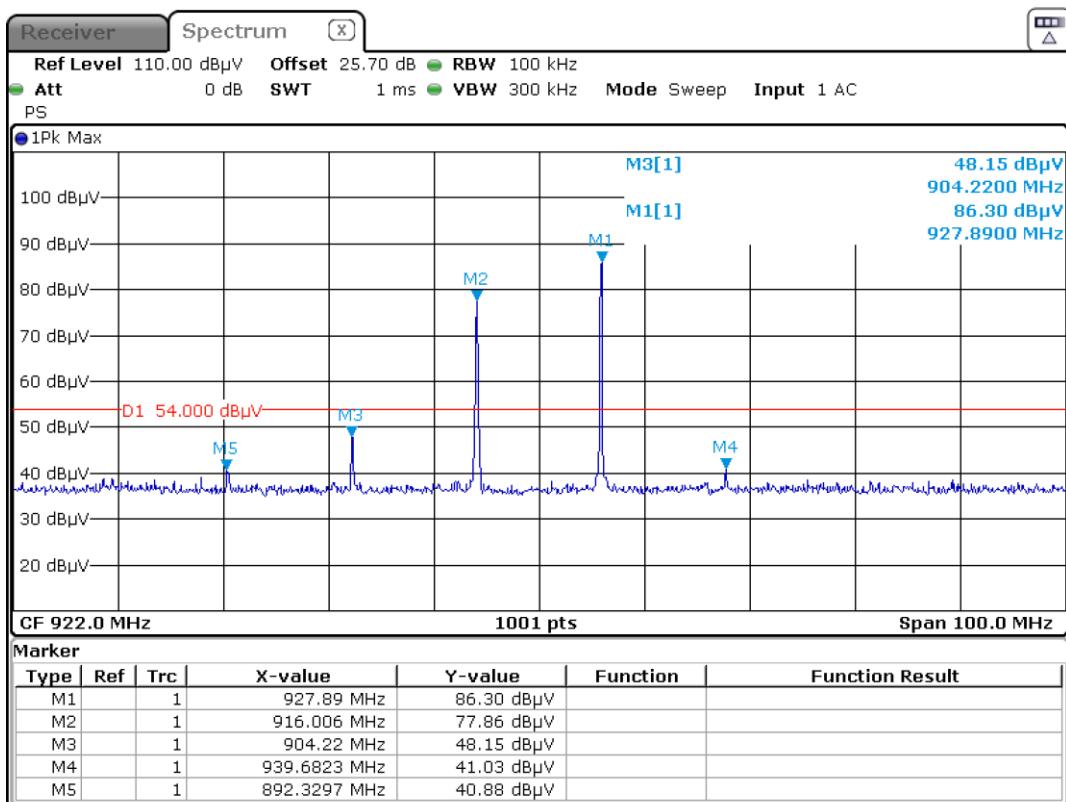


Figure 8.1-22: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 6

8.1.4 Test data, continued



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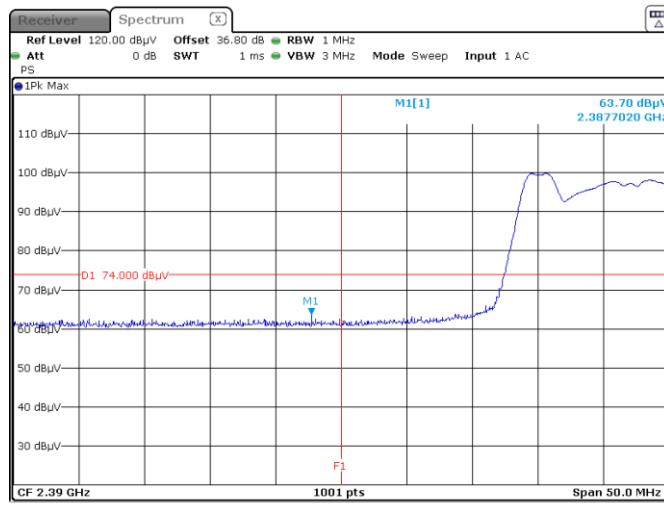
**Figure 8.1-23:** Radiated spurious emissions products from co-located transmitters, Configuration 6 (Z-Wave and TI Chip) Peak detector

#### 8.1.4 Test data, continued

Table 8.1-4: Radiated field strength measurement results for 802.11b and ZigBee

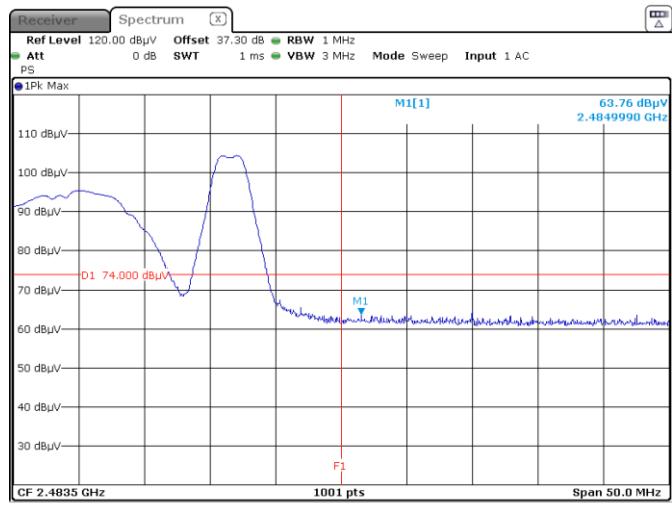
Channel	Frequency, MHz	Peak Field strength, dB $\mu$ V/m		Margin, dB	Average Field strength, dB $\mu$ V/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	2390	63.7	74.0	10.3	40.6	54.0	13.4
High	2483.5	63.8	74.0	10.2	45.3	54.0	8.7

Notes: Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.



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Figure 8.1-24: Lower band edge, Configuration 7 (Wi-Fi Low Channel and ZigBee Low Channel) Peak detector



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Figure 8.1-25: Upper band edge, Configuration 7 (Wi-Fi high Channel and ZigBee high Channel) Peak detector



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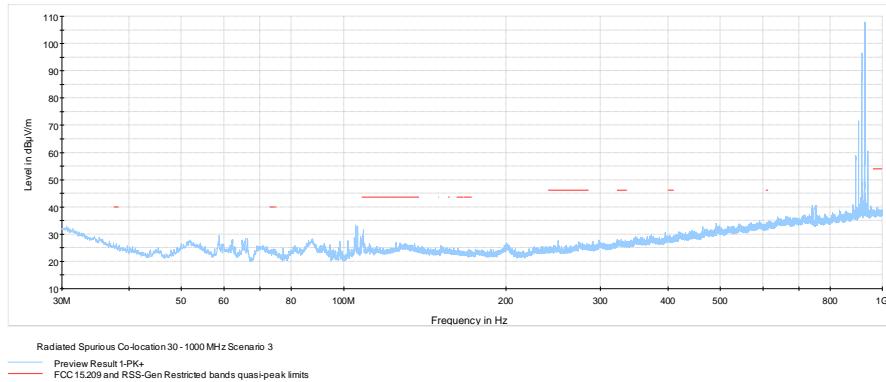
Figure 8.1-26: Lower band edge, Configuration 7 (Wi-Fi Low Channel and ZigBee Low Channel) Average detector



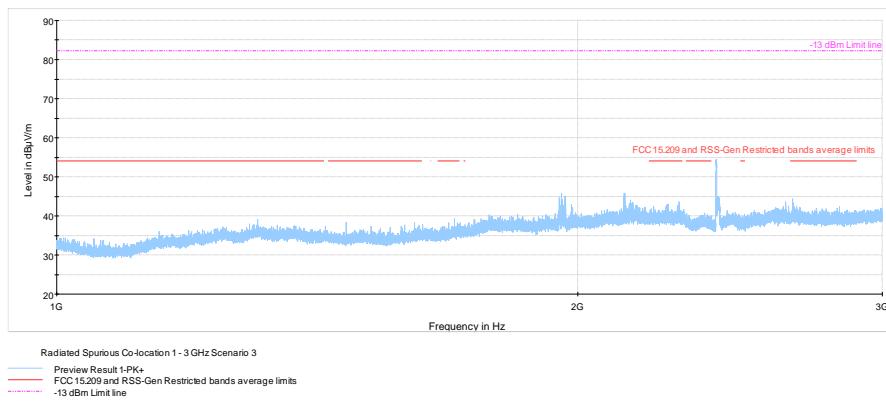
Date: 20.NOV.2019 18:19:24

Figure 8.1-27: Upper band edge, Configuration 7 (Wi-Fi high Channel and ZigBee high Channel) Average detector

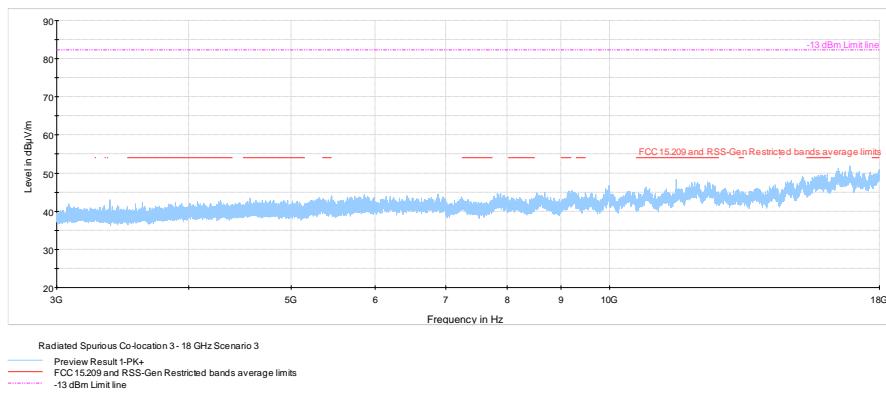
8.1.4 Test data, continued



**Figure 8.1-28: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 7**



**Figure 8.1-29: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 7**



**Figure 8.1-30: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 7**

#### 8.1.4 Test data, continued

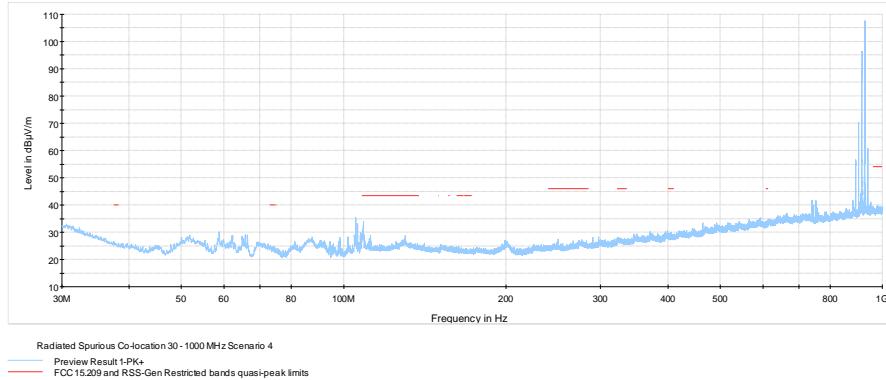


Figure 8.1-31: Radiated spurious emissions products from co-located transmitters, 30 MHz – 1 GHz, Configuration 8

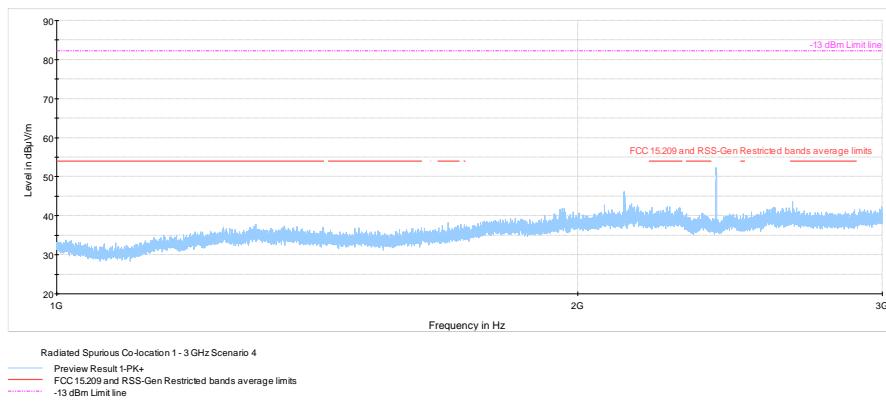


Figure 8.1-32: Radiated spurious emissions products from co-located transmitters, 1 – 3 GHz, Configuration 8

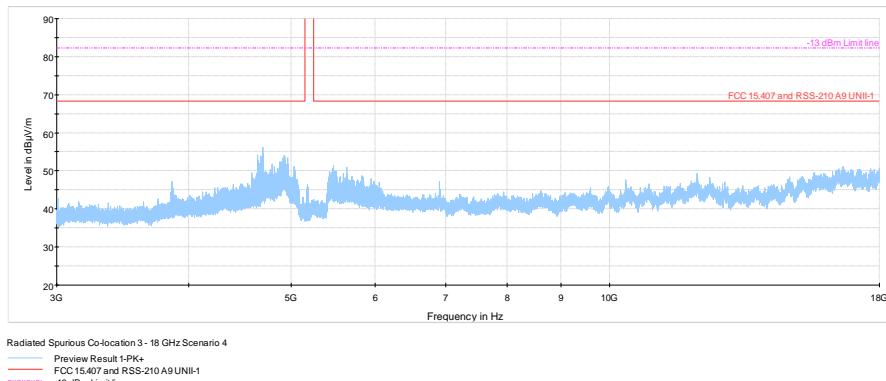
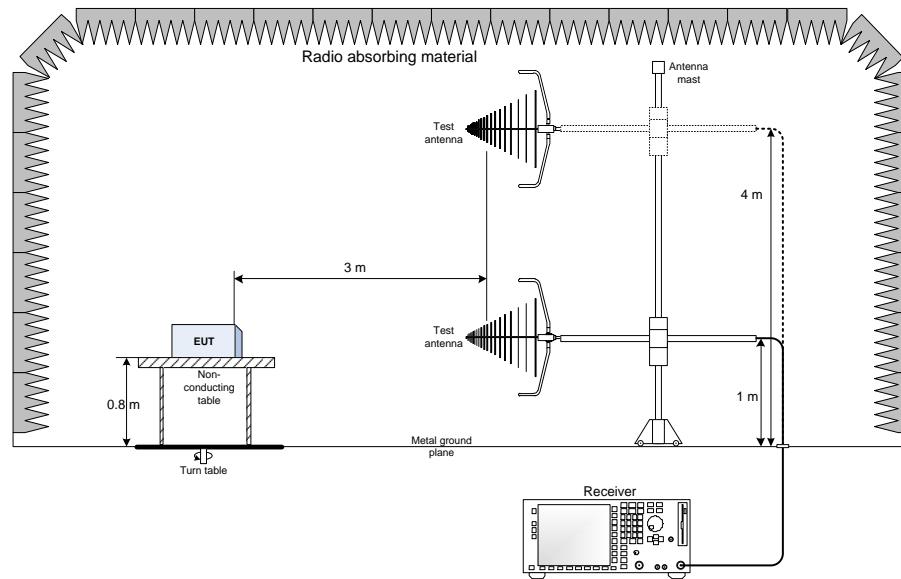


Figure 8.1-33: Radiated spurious emissions products from co-located transmitters, 3 – 18 GHz, Configuration 8

## Section 9. Block diagrams of test set-ups

### 9.1 Radiated emissions set-up for frequencies below 1 GHz



### 9.2 Radiated emissions set-up for frequencies above 1 GHz

