N° 1-6736
Scope available
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CERTIFICATE #3478.01

TEST REPORT

EUT Description	**Notebook**
Brand Name	**HP**
Model Name	**HSN-I38C**
FCC/IC ID	**FCC ID: B94HNI38PDHP2, IC ID: 21374-L850GL**
Date of Test Start/End	**2020-02-21 / 2020-03-03**
Features	**WWAN (LTE, UMTS), WLAN, BT** **(see section 5)**

Applicant	**HP Inc.**
Address (FCC)	**3390 East Harmony Road, Fort Collins Colorado, USA 80528**
Address (IC)	**Post B1-L4F0063, 10300 Energy Dr Spring TX 77389 United States**
Contact Person	**Sam Lin**
Telephone/Fax/ Email	**(TEL) +886 2 37896331/ (Email) sam.lin2@hp.com**

Reference Standards	**FCC CFR Title 47 Part 2, 22, 24, 27,90** **RSS-Gen issue 5-A1, RSS 130 issue 2, RSS 132 issue 3, RSS 133 issue 6, RSS 139 issue 3, RSS-195 issue 2, RSS 199 issue 3** (see section 1)

Test Report identification	**200120-08.TR11**
Revision Control	**Rev. 00** **This test report revision replaces any previous test report revision** (see section 8)

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.
Reference to accreditation shall be used only by full reproduction of test report.

Issued by

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Table of Contents

1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 2 - Subpart J - Equipment Authorization Procedures.
2. FCC 47 CFR part 22 - Subpart H - Cellular Radiotelephone Service.
3. FCC 47 CFR part 24 – Subpart E - Broadband PCS.
4. FCC 47 CFR part 27 – Subpart C - Technical Standards.
5. FCC 47 CFR part 27 – Subpart L - 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands.
6. FCC 47 CFR part 90 – Subpart S - 806-824, 851-869, 896-901, and 935-940 MHz Bands.
7. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.
8. RSS-Gen issue 5 Amendment 1 - General Requirements for Compliance of Radio Apparatus.
9. RSS 130 issue 2 - Equipment Operating in the Frequency Bands 617 – 652 MHz, 663 – 698 MHz, 698-756 MHz and 777-787 MHz.
10. RSS 132 issue 3 - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz.
11. RSS 133 issue 6 - 2 GHz Personal Communications Services.
12. RSS 139 issue 3 - Advanced Wireless Services Equipment Operating in the Bands 1710–1755 MHz and 2110–2155 MHz.
13. RSS-195 issue 2 - Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz.
14. RSS-199 issue 3 - Broadband Radio Services (BRS) Equipment Operating in the Bands 2500-2690 MHz
15. C63.26-2015 - IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

2. General conditions, competences and guarantees

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- ✓ Tests performed under ISED standards identified on section 1 are covered by Cofrac accreditation.
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- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
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3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22ºC ± 3ºC
Humidity	43% ± 5%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	200120-08.S10	Convertible PC HongBo AX201NGW + L850-GL	HP Oleander	00095100QP	27/01/2020	N/A

5. EUT Features

Brand Name	HP
Model Name	HSN-I38C
Prototype / Production	Production
Supported Radios	The Fibocom M2 L850 GL module supports only UMTS and LTE, without carrier aggregation. The applicable frequency bands and operating modes are identified in the following table, where North America bands are shown in bold.

WWAN:

Mode	Bands	Supported Tx Mode			
		WCDMA	HSDPA	HSUPA	DC-HSDPA
WCDMA / HSPA+	**FDD II (1850.0 – 1910.0 MHz)**	✓	✓	✓	✓
	FDD IV (1710.0 – 1755.0 MHz)	✓	✓	✓	✓
	FDD V (824.0 – 849.0 MHz)	✓	✓	✓	✓
	FDD VIII (880.0 – 915.0 MHz)	✓	✓	✓	✓

Mode	Bands	Supported Channel Bandwidth (MHz)					
		1.4	3	5	10	15	20
LTE FDD	**Band 2 (1850.0 – 1910.0 MHz)**	✓	✓	✓	✓	✓	✓
	Band 4 (1710.0 – 1755.0 MHz)	✓	✓	✓	✓	✓	✓
	Band 5 (824.0 – 849.0 MHz)	✓	✓	✓	✓		
	Band 7 (2500.0 – 2570.0 MHz)			✓	✓	✓	✓
	Band 12 (699.0 – 716.0 MHz)	✓	✓	✓	✓		
	Band 13 (777.0 – 787.0 MHz)			✓	✓		
	Band 17 (704.0 – 716.0 MHz)			✓	✓		
	Band 18 (815.0 – 830.0 MHz)			✓	✓	✓	
	Band 19 (830.0 – 845.0 MHz)			✓	✓	✓	
	Band 26 (814.0 – 849.0 MHz)	✓	✓	✓	✓	✓	
	Band 28 (703.0 – 748.0 MHz)		✓	✓	✓	✓	✓
	Band 30 (2305.0 – 2315.0 MHz)			✓	✓		
	Band 66 (1710.0 – 1780.0 MHz)	✓	✓	✓	✓	✓	✓
LTE TDD	Band 38 (2570.0 – 2620.0 MHz)			✓	✓	✓	✓
	Band 40 (2300.0 – 2400.0 MHz)			✓	✓	✓	✓
	Band 41 (2496.0 – 2690.0 MHz)			✓	✓	✓	✓

WLAN/BT

Mode	UL Freq Range (MHz)
802.11b/g/n/ax	2400-2483.5
802.11a/n/ac/ax	5150-5250
	5250-5350
	5475-5725
	5725-5850
BDR/EDR v5.0	2400-2483.5
Bluetooth LE v5.0	2400-2483.5

Antenna Information	HONG-BO PIFA Antenna WWAN (TX1), 6036B0251801 (260-27363) HONG-BO PIFA Antenna WWAN (TX2), 6036B0252501 (260-27364)

6. Remarks and comments

The tested configurations were selected based on the worst-case spurious emissions per frequency band from modular type approval report.
The smallest bandwidth and RB were selected in order to guarantee the worst case in terms of power density.

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

Band	FCC part	RSS part	Test name	Verdict
WCDMA II	24.238, 2.1053	133-ch 6.5.1	Radiated spurious emission	P
WCDMA IV	27.53 (h), 2.1053	139-ch.6.5	Radiated spurious emission	P
WCDMA V	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	P
LTE 2	24.238, 2.1053	133-ch 6.5.1	Radiated spurious emission	P
LTE 5	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	P
LTE 13	27.53 (g)(f), 2.1053	130-ch.4.7	Radiated spurious emission	P
LTE 26	90.691, 22.917, 2.1053	132-ch.5.5	Radiated spurious emission	P
LTE 30	27.53 (a)(4), 2.1053	195- ch.5.6.2	Radiated spurious emission	P
LTE 41	27.53 (m), 2.1053	199-ch.4.5	Radiated spurious emission	P

P: Pass
F: Fail
NM: Not Measured
NA: Not Applicable

8. Document Revision History

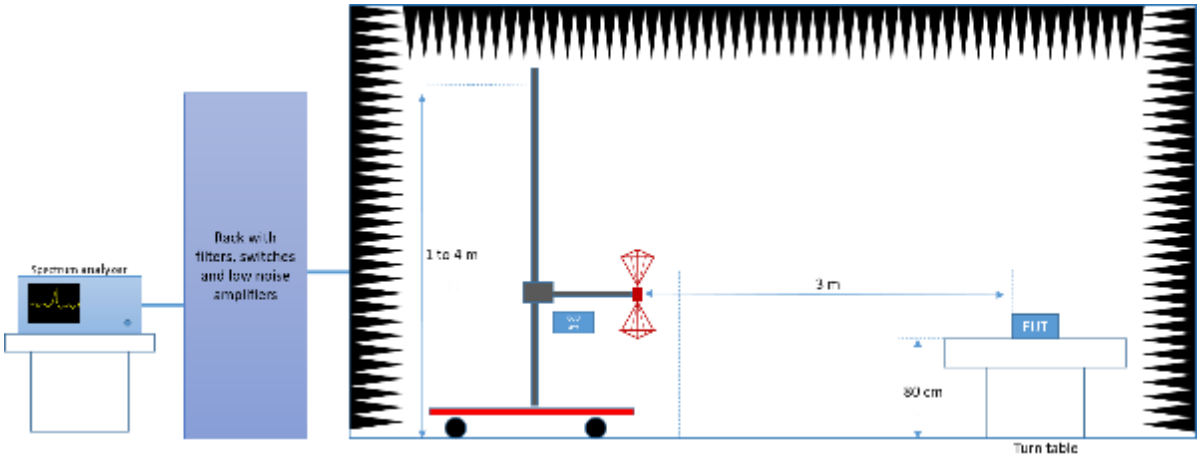
Revision #	Date	Modified by	Revision Details
Rev. 00	2020-03-03	A.LOUNES	First Issue

Annex A. Test & System Description

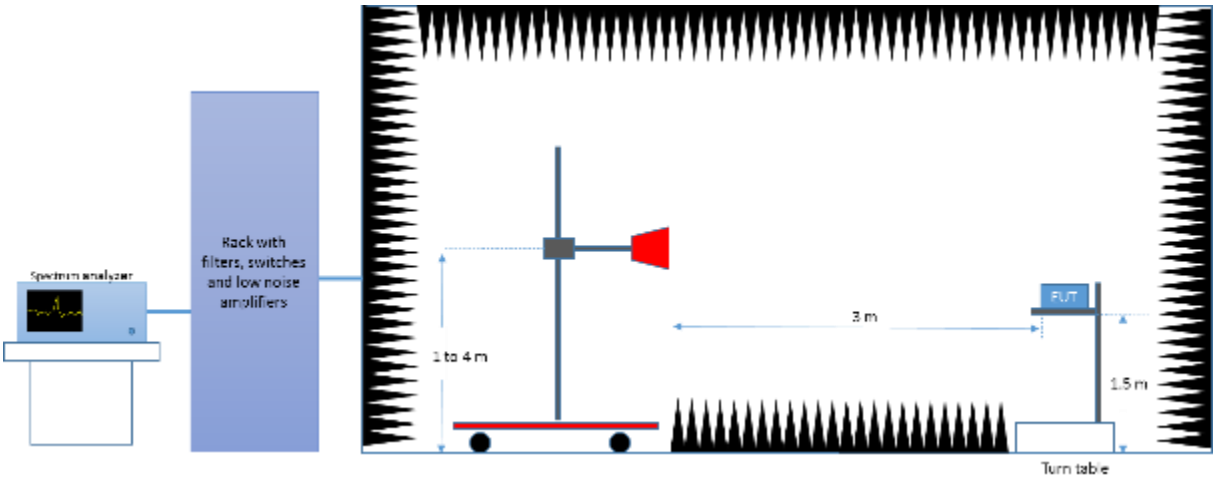
A.1 Measurement System

Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

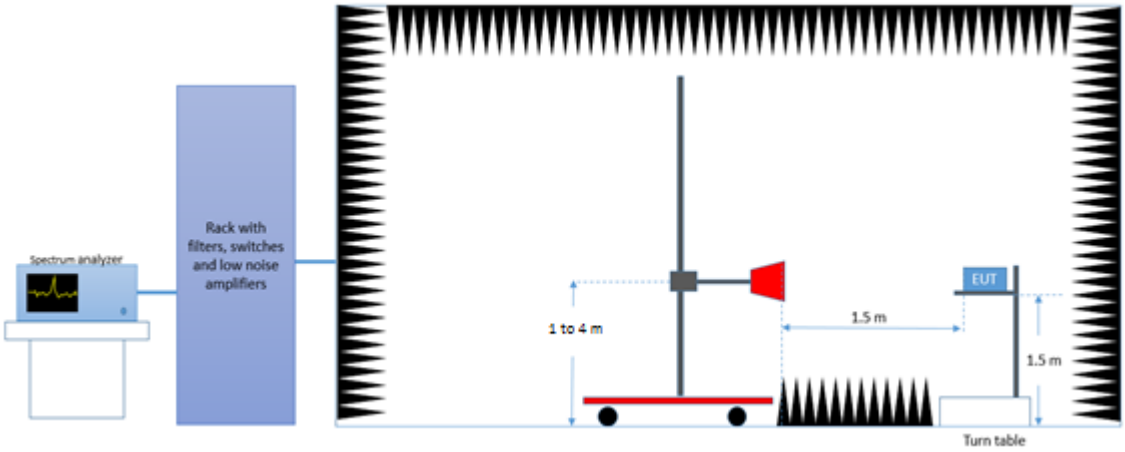
Radiated Setup 30MHz- 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup Frequency range 18 GHz to 40 GHz



Sample Calculation

The spurious received power P at the spectrum Analyzer is converted to EIRP the equivalent isotropically radiated power, in dBm using the transducer factor F corresponding to the Rx path Loss:

F (dB) = Free Space Attenuation (dB) + Cable losses (dB) – Amplifiers Gain (dB) - Rx Antenna Gain (dBi)
EIRP (dBm) = P(dBm) + F (dB)

A.2 Test Equipment List

A.2.1 Radiated Setup #1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2018-05-17	2020-05-17
0993	BiConical antenna 30 MHz – 1 GHz	UBAA9115+BBVU9135+ DGA9552N	0286+CH 9044	Schwarzbeck	2019-11-22	2021-11-21
0141	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2018-05-11	2020-05-11
0325	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157734	ETS Lindgren	2019-08-12	2021-08-12
0139	Horn Antenna 3116+ Amplifier 18GHz – 26.5GHz	3116	00167100	ETS Lindgren	2018-04-06	2020-04-06
0135	Anechoic chamber	FACT 3	5720	ETS Lindgren	2018-04-18	2020-04-18
0329	Measurement Software	EMC32 V10.40.10	100401	Rohde & Schwarz	N/A	N/A
0996	Communication tester	CMW500	163104	Rohde & Schwarz	N/A	N/A
0622	Communication tester	CMW500	163186	Rohde & Schwarz	2019-05-02	2020-05-02
0210	Communication tester	CMW500	147712	Rohde & Schwarz	N/A	N/A
0797	Temperature & Humidity logger	RA12E-TH1-RAS	RA12-D0EB1A	AVTECH	2019-04-07	2021-04-07

N/A: Not applicable

A.2.2 Radiated Setup #2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0419	Spectrum analyzer	FSW67	103266	Rohde & Schwarz	2019-02-04	2021-02-04
0334	Horn Antenna 3116C+ Amplifier 18GHz – 40GHz	3116C-PA	00169308bis + 00196308	ETS Lindgren	2019-07-24	2021-07-24
0337	Full Anechoic chamber	RFD-FA-100	5996	ETS Lindgren	2019-09-09	2021-09-09
0128	Measurement Software	EMC32 10.50.10	1520.9791.00 (100931)	Rohde & Schwarz	N/A	N/A
0996	Communication tester	CMW500	163104	Rohde & Schwarz	N/A	N/A
0581	Temperature & Humidity logger	RA12E-TH1-RAS	RA12-B89BE3	AVTECH	2020-01-23	2022-01-23

N/A: Not applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [±dB]
Radiated test < 1GHz	± 2.95
Radiated test 1GHz – 26.5 GHz	± 5.02

Annex B. Test Results

B.1 Radiated spurious emission

B.1.1 Standard references

Band	FCC part	RSS Part	FCC Limit	IC Limit
WCDMA II LTE 2	24.238 2.1053	133-ch 6.5.1	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) dB	(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1 MHz is required.
WCDMA IV	27.53 (h) 2.1053	139-ch.6.5	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) dB	(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
WCDMA V LTE 5 LTE 26	22.917 2.1053 90.691	132-ch.5.5	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) dB	(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.
LTE 13	27.53 (g)(f) 2.1053	130-ch.4.7	The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In addition, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions: a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least: (i) 76 + 10 log10 p (watts), dB, for base and fixed equipment, and (ii) 65 + 10 log10 p (watts), dB, for mobile and portable equipment. b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.

<table>
<tr><th>Band</th><th>FCC part</th><th>RSS Part</th><th>FCC Limit</th><th>IC Limit</th></tr>
<tr><td>LTE 30</td><td>27.53 (a)(4), 2.1053</td><td>195-ch.5.6.2</td><td>By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;
(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;
(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Attenuation (dB)</th></tr>
<tr><td><2200</td><td>43 + 10 log10(p)</td></tr>
<tr><td>2200 - 2288</td><td>70 + 10 log10(p)</td></tr>
<tr><td>2288 - 2292</td><td>67 + 10 log10(p)</td></tr>
<tr><td>2292 - 2296</td><td>61 + 10 log10(p)</td></tr>
<tr><td>2296 - 2300</td><td>55 + 10 log10(p)</td></tr>
<tr><td>2300 - 2305</td><td>43 + 10 log10(p)</td></tr>
<tr><td>2305 - 2320</td><td>43 + 10 log10(p)</td></tr>
<tr><td>2320 - 2324</td><td>55 + 10 log10(p)</td></tr>
<tr><td>2324 - 2328</td><td>61 + 10 log10(p)</td></tr>
<tr><td>2328 - 2337</td><td>67 + 10 log10(p)</td></tr>
<tr><td>2337 - 2341</td><td>61 + 10 log10(p)</td></tr>
<tr><td>2341 - 2345</td><td>55 + 10 log10(p)</td></tr>
<tr><td>2345 - 2360</td><td>43 + 10 log10(p)</td></tr>
<tr><td>2360 - 2365</td><td>43 + 10 log10(p)</td></tr>
<tr><td>2365 - 2395</td><td>70 + 10 log10(p)</td></tr>
<tr><td>>2395</td><td>43 + 10 log10(p)</td></tr>
</table>
</td></tr>
<tr><td>LTE 41</td><td>27.53 (m), 2.1053</td><td>199-ch.4.5</td><td>For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.</td><td>for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

(i) 40 + 10 log10 p from the channel edges to 5 MHz away
(ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
(iii) 55 + 10 log10 p at X MHz and beyond from the channel edges
In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.</td></tr>
</table>

B.1.2 Test procedure

The setup described in Test & System Description was used to measure the radiated spurious emissions. The test was done following the FCC OET KDB 971168 D01 v03r01.
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 from 1 to 4 meters, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.

B.1.3 Test Results

WCDMA 2

30 MHz to 26.5 GHz - Radiated Spurious
WCDMA 2- QPSK - Low channel – 1850 MHz
BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-68.4	-13.0	55.4
5560.1	-44.7	-13.0	31.7
17076.8	-39.4	-13.0	26.4
25783.5	-56.6	-13.0	43.6

WCDMA 4

30 MHz to 18GHz - Radiated Spurious
WCDMA 4- QPSK - Mid channel – 1732.5 MHz
BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
216.9	-69.9	-13.0	56.9
5200.7	-43.8	-13.0	30.8
17686.9	-38.3	-13.0	25.3

WCDMA 5

30 MHz to 18 GHz - Radiated Spurious
WCDMA 5- QPSK - Mid channel – 836.5 MHz
BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
979.1	-35.7	-13.0	22.7
1674.3	-57.6	-13.0	44.6
2507.3	-53.4	-13.0	40.4
5194.3	-50.2	-13.0	37.2

LTE 2

30MHz to 26.5GHz - Radiated Spurious
LTE 2- QPSK – High channel – 1910 MHz
BW 1.4 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-68.2	-13.0	55.2
5726.8	-44.6	-13.0	31.6
17008.3	-38.9	-13.0	25.9
25764.5	-56.2	-13.0	43.2

LTE 13

30MHz to 18GHz - Radiated Spurious
LTE 13 - QPSK - Mid channel – 782 MHz
BW 5 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
961.7	-36.1	-13.0	23.1
1559.6	-62.7	-40.0	22.7
2339.2	-38.8	-13.0	25.8

LTE 26

30MHz to 18GHz - Radiated Spurious
LTE 26 - QPSK - Mid channel - 831.5 MHz
BW 1.4 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
999.7	-36.0	-13.0	23.0
1662.1	-59.6	-13.0	46.6
2492.7	-45.9	-13.0	32.9
4850.5	-37.1	-13.0	24.1

LTE 30

30MHz to 26.5GHz - Radiated Spurious
LTE 30 - QPSK - Mid channel - 2310 MHz
BW 5 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-66.7	-40.0	26.7
4615.7	-53.0	-40.0	13.0
6923.7	-45.5	-40.0	5.5
13847.0	-54.8	-40.0	14.8
16347.1	-56.6	-40.0	16.6
17112.1	-57.3	-40.0	17.3
25782.0	-56.8	-40.0	16.8

LTE 41

30MHz to 26.5GHz – Radiated Spurious
LTE 41 – QPSK – High channel 2690
BW 5 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-69.4	-25.0	44.4
5324.0	-50.8	-25.0	25.8
17997.5	-55.6	-25.0	30.6
38992.0	-53.2	-25.0	28.2