

# TEST REPORT

EUT Description	<b>Convertible PC</b>
Brand Name	<b>HP</b>
Model Name	<b>TPN-Q273</b>
FCC/IC ID	<b>FCC ID: B94TNQ273GPPD; IC ID: 21374-L850GL</b>
Date of Test Start/End	<b>2022-03-23 / 2022-03-24</b>
Features	<b>WWAN (LTE, UMTS) (see section 5)</b>

Applicant	<b>HP Inc.</b>
Address	<b>1501 Page Mill Road, Palo Alto CA 94304 USA</b>
Contact Person	<b>Sam Lin</b>
Telephone/Fax/ Email	<b>+886 2 37896331 / sam.lin2@hp.com</b>

Reference Standards	<b>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 A1,    RSS 139 issue 3, RSS-195 issue 2, RSS 199 issue 3    (see section 1)</b>
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Test Report identification	<b>211206-02.TR07</b>
Revision Control	<b>Rev. 01    This test report revision replaces any previous test report revision    (see section 8)</b>

The test results relate only to the samples tested.  
 Reference to accreditation shall be used only by full reproduction of test report.

\_\_\_\_\_ Issued by \_\_\_\_\_ Reviewed by \_\_\_\_\_

Khodor RIDA  
 (RF Test Engineer Lead)

Ines KHARRAT  
 (Technical Manager)

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## 1. Standards, reference documents and applicable test methods

FCC	<ol style="list-style-type: none"> <li>1. FCC Title 47 CFR part 2 - Subpart J - Equipment Authorization Procedures. 2020-10-01 Edition</li> <li>2. FCC Title 47 CFR part 22 - Subpart H - Cellular Radiotelephone Service. 2020-10-01 Edition</li> <li>3. FCC Title 47 CFR part 24 – Subpart E - Broadband PCS. 2020-10-01 Edition</li> <li>4. FCC Title 47 CFR part 27 – Subpart C - Technical Standards. 2020-10-01 Edition</li> <li>5. FCC Title 47 CFR part 27 – Subpart L - 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands. 2020-10-01 Edition</li> <li>6. FCC Title 47 CFR Part 90 - Subpart R - Regulations governing the licensing and use of frequencies in the 763-775 and 793-805 MHz bands. 2020-10-01 Edition</li> <li>7. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.</li> <li>8. C63.26-2015 - IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services</li> </ol>
ISED	<ol style="list-style-type: none"> <li>1. ISED RSS-Gen issue 5 A1 - General Requirements for Compliance of Radio Apparatus.</li> <li>2. ISED RSS-130 issue 2 - Equipment Operating in the Frequency Bands 617-652 MHz, 663-698 MHz, 698-756 MHz and 777-787 MHz</li> <li>3. ISED RSS 132 issue 3 - Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz</li> <li>4. ISED RSS 133 issue 6 A1 - 2 GHz Personal Communications Services.</li> <li>5. ISED SRSP-510 — Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz</li> <li>6. ISED RSS 139 issue 3 - Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz</li> <li>7. ISED RSS-195 issue 2 - Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz</li> <li>8. ISED RSS-199 issue 3 - Broadband Radio Services (BRS) Equipment Operating in the Bands 2500-2690 MHz</li> <li>9. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.</li> <li>10. C63.26-2015 - IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services</li> <li>11. C63.4-2014 – American National Standard for Methods of measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.</li> </ol>

## 2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified in section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified in section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ 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.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

### 3. Environmental Conditions

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

Temperature	23.1°C ± 1.9°C
Humidity	27.9% ± 3.1%

#### 4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	211206-02.S01	Convertible PC	HP TPN-Q273	A5CD14195DT	7/12/2021	N/A
#02	211206-02.S03	Convertible PC	HP TPN-Q273	A5CD14195F8	7/12/2021	N/A

#### 5. EUT Features

The herein information is provided by the customer.

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report.

Brand Name	HP								
Model Name	TPN-Q273								
Prototype / Production	Production								
Supported Radios	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)	✓	✓	✓	✓			
	LTE FDD	Bands	Modulation	Bandwidth					
				1.4	3	5	10	15	20
		Band 2 (1850.0 – 1910.0 MHz)	QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓	✓	✓
		Band 4 (1710.0 – 1755.0 MHz)	QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓	✓	✓
		Band 5 (824.0 – 849.0 MHz)	QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓		
		Band 7 (2500.0 – 2570.0 MHz)	QPSK/16QAM/64QAM/256QAM			✓	✓	✓	✓
		Band 12 (699.0 – 716.0 MHz)	QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓		
		Band 13 (777.0 – 787.0 MHz)	QPSK/16QAM/64QAM/256QAM			✓	✓		
		Band 17 (704.0 – 716.0 MHz)	QPSK/16QAM/64QAM/256QAM			✓	✓		
		Band 26 (814.0 – 849.0 MHz)	QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓	✓	
Band 30 (2305.0 – 2315.0 MHz)		QPSK/16QAM/64QAM/256QAM			✓	✓			
Band 66 (1710.0 – 1780.0 MHz)		QPSK/16QAM/64QAM/256QAM	✓	✓	✓	✓	✓	✓	
LTE TDD	Band 38 (2570.0 – 2620.0 MHz)	QPSK/16QAM/64QAM/256QAM			✓	✓	✓	✓	
	Band 41 (2496.0 – 2690.0 MHz)	QPSK/16QAM/64QAM/256QAM			✓	✓	✓	✓	
Antenna Information	Transmitter	Main (Antenna 5)	Aux (Antenna 6)						
	Manufacturer	WNC	WNC						
	Antenna type	PIFA antenna	PIFA antenna						
	Part number	DNQTA249001 (81ELA215.G32)	DNQTA249001 (81ELA215.G31)						
	Antenna peak gain (dBi)	-0.2 dBi	-0.2 dBi						

## 6. Remarks and comments

1. The tested configurations were selected based on the worst-case spurious emissions per frequency band from modular type approval report
2. The smallest bandwidth and 1 RB offset 0 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	Tx Radiated spurious emission	Pass
WCDMA IV	27.53 (h), 2.1053	139-ch.6.5	Tx Radiated spurious emission	Pass
WCDMA V	22.917, 2.1053	132-ch.5.5	Tx Radiated spurious emission	Pass
LTE 2	24.238, 2.1053	133-ch 6.5.1	Tx Radiated spurious emission	Pass
LTE 4	27.53 (h), 2.1053	139-ch.6.5	Tx Radiated spurious emission	NM
LTE 5	22.917, 2.1053	132-ch.5.5	Tx Radiated spurious emission	Pass
LTE 7	27.53 (m), 2.1053	199-ch.4.5	Tx Radiated spurious emission	Pass
LTE 12	27.53 (g), 2.1053	130-ch.4.7	Tx Radiated spurious emission	Pass
LTE 13	27.53 (g)(f), 2.1053	130-ch.4.7	Tx Radiated spurious emission	Pass
LTE 17	27.53 (g), 2.1053	130-ch.4.7	Tx Radiated spurious emission	NM
LTE 26	90.691, 22.917, 2.1053	132-ch.5.5	Tx Radiated spurious emission	Pass
LTE 30	27.53 (a)(4), 2.1053	195- ch.5.6.2	Tx Radiated spurious emission	Pass
LTE 38	27.53 (m), 2.1053	199-ch.4.5	Tx Radiated spurious emission	NM
LTE 41	27.53 (m), 2.1053	199-ch.4.5	Tx Radiated spurious emission	Pass
LTE 66	27.53(h), 2.1053	139-ch.6.5	Tx Radiated spurious emission	Pass

P: Pass

F: Fail

NM: Not Measured

NA: Not Applicable

## 8. Document Revision History

Revision #	Modified by	Revision Details
Rev. 00	N.Bui	First Issue
Rev. 01	K.RIDA	Update FCC ID

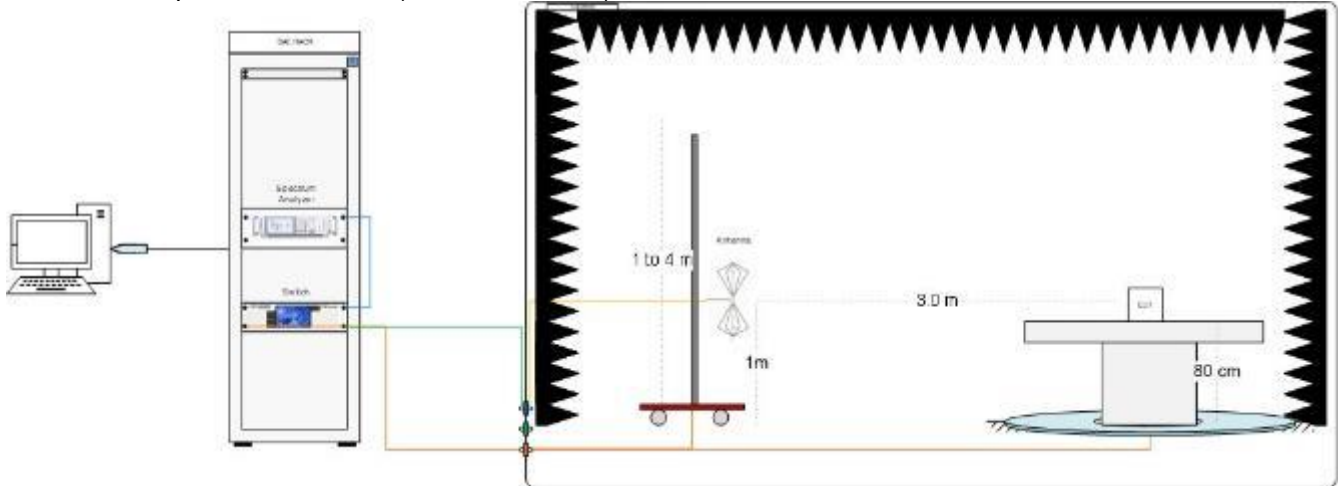
# Annex A. Test & System Description

## A.1 Measurement System

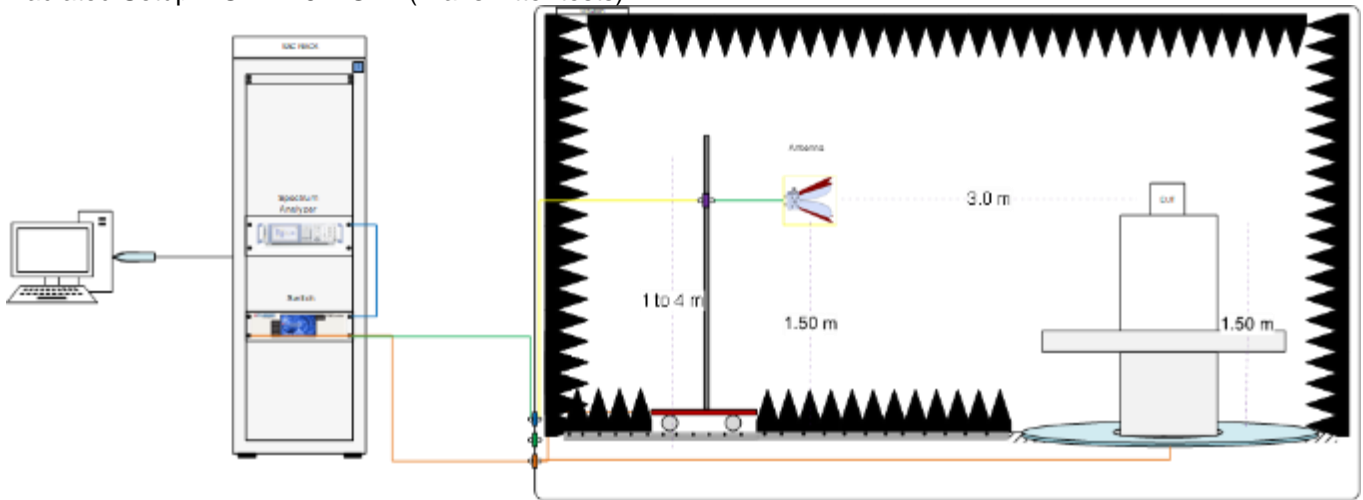
Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

### Radiated test setup

#### Radiated Setup 30 MHz - 1 GHz (Transmitter tests)

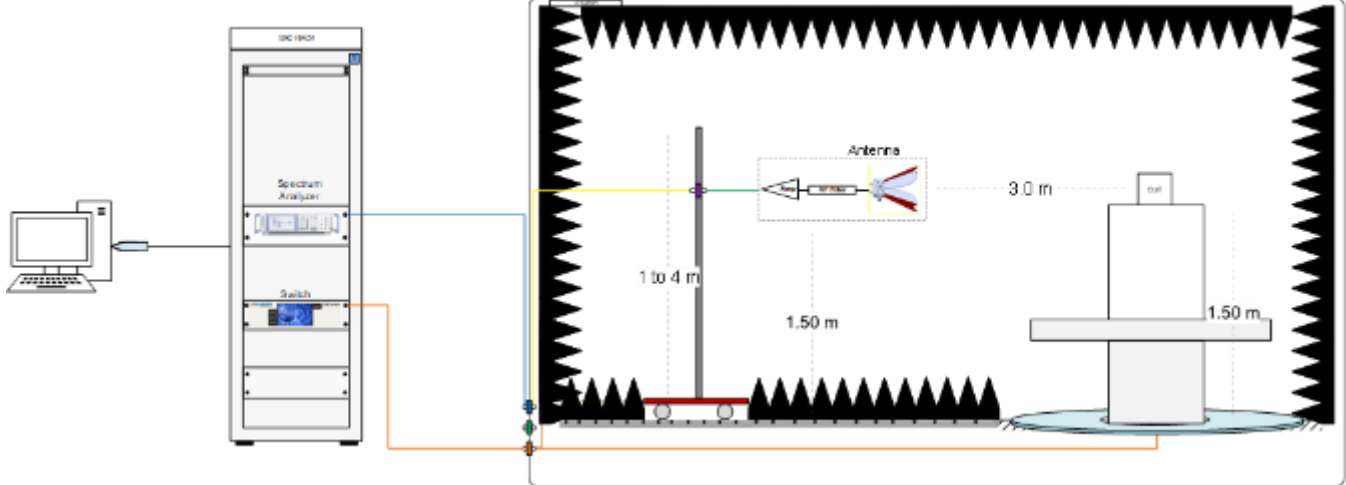


#### Radiated Setup 1 GHz – 6.4 GHz (Transmitter tests)

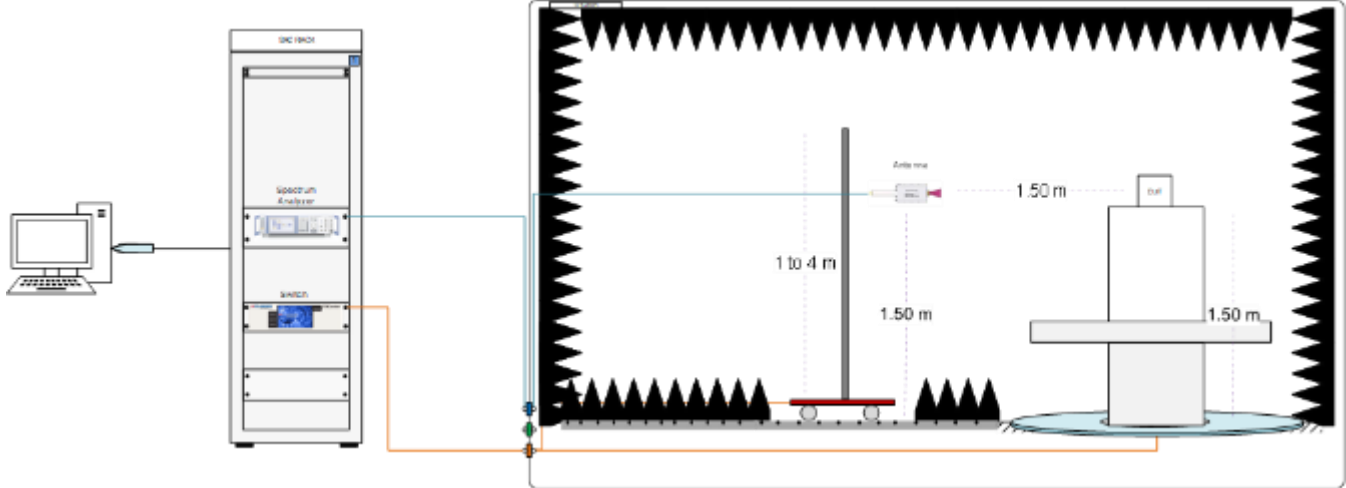




Radiated Setup 6.4 GHz – 18 GHz (Transmitter tests)



Radiated Setup 18 GHz – 40 GHz (Transmitter tests)



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:

$$F \text{ (dB)} = \text{Free Space Attenuation (dB)} + \text{Cable losses (dB)} - \text{Amplifiers Gain (dB)} - \text{Rx Antenna Gain (dBi)}$$
$$\text{EIRP (dBm)} = P(\text{dBm}) + F \text{ (dB)}$$

## A.2 Test Equipment List

### A.2.1 Radiated Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
006-000	Anechoic chamber	FACT 3	5720	ETS Lindgren	2022-01-21	2024-01-21
006-008	Measurement Software v11.30.00	EMC32	100623	Rohde & Schwarz	N/A	N/A
147-000	Spectrum analyzer	FSW43	101847	Rohde & Schwarz	2020-11-02	2022-11-02
006-002	Switch & Positioning	EMC center	00159757	ETS Lindgren	N/A	N/A
006-003	Multi axis Positioning	2116CR-5905	00153265	ETS Lindgren	N/A	N/A
006-011	Boresight antenna mast	BAM4.0-P	P/278/2890.01	Maturo	N/A	N/A
006-019	Biconical antenna 30 MHz – 1 GHz	UBAA9115 + BBVU9135 + DGA9552N	0286 + CH 9044	Schwarzbeck	2022-02-01	2024-02-01
006-020	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157734	ETS Lindgren	2021-08-05	2023-08-05
056-000	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2020-04-01	2022-04-01
007-008	Double Horn Ridged antenna	3116C-PA	00169308bis + 00196308	ETS-Lindgren	2021-08-05	2023-08-05
006-023	Conical log spiral antenna	3102	00154400	ETS Lindgren	NA	NA
006-059	RF Cable 7.0m	R286304174	20.46.369	Radiall	2022-03-04	2022-09-04
006-051	RF Cable 1.0m	CBL-1.5M-SMSM+	202879	Mini-Circuits	2022-02-02	2022-08-02
006-030	RF Cable 1.2m	UFA147A-0-0480-200200	MFR 64639223720-003	Micro-coax	2022-02-02	2022-08-02
006-034	RF Cable 1.0m	UFA147A	-	Utilflex	2022-02-02	2022-08-02
006-036	RF Cable 1.0m	UFB311A-0-0590-50U50U	MFR 64639 223230-001	Micro-coax	2022-02-02	2022-08-02
006-038	RF Cable 7.0m	R286304009	-	Radiall	2022-02-02	2022-08-02
006-039	RF Cable 2.5m	0500990992500KE	19.23.395	Radiall	2022-02-02	2022-08-02
006-033	RF Cable 2.5m	UFA147A-0-1380-50U200	MFR 64639223219-001	Micro-coax	N/A	N/A
365-000	Temperature & Humidity logger	RA12E-TH1-RAS	00-80-A3-E1-6E-55	Avtech	2021-03-08	2023-03-08
295-000	Communication tester	CMW500	147712	Rohde & Schwarz	N/A	N/A
320-000	Communication tester	CMW500	158429	Rohde & Schwarz	2020-04-15	2022-04-15

Radiated Setup #2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
007-000	Anechoic chamber	RFD-FA-100	5996	ETS Lindgren	2021-09-14	2023-09-14
007-002	Turntable	-	-	ETS Lindgren	N/A	N/A
007-003	Antenna Tower	2171B-3.0M	00150123	ETS Lindgren	N/A	N/A
007-006	Switch & Positioner	EMCenter	00151232	ETS Lindgren	N/A	N/A
007-005	Measurement SW, V11.20.00	EMC32	100401	Rohde & Schwarz	N/A	N/A
127-000	Spectrum Analyzer	FSV40	101358	Rohde & Schwarz	2021-01-15	2023-01-15
006-020	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157734	ETS Lindgren	2021-08-05	2023-08-05
056-000	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2020-04-01	2022-04-01
007-008	Double Horn Ridged antenna	3116C-PA	00169308bis + 00196308	ETS-Lindgren	2021-08-05	2023-08-05
007-030	Horn Antenna 1-18GHz	3115	9911-5967	Emco	N/A	N/A
007-022	RF Cable 1-18GHz, 1.5m	0501050991200GX	19.23.493	Radiall	2022-02-03	2022-08-03
007-020	RF Cable 1-18GHz, 1.2 m	2301761761200PJ	12.22.1104	Radiall	2022-02-03	2022-08-03
007-011	RF Cable 1-18GHz – 6.5m	140-8500-11-51	001	Spectrum	2022-02-03	2022-08-03
007-015	RF Cable 1GHz-18GHz 1.5m	-	-	Spirent	2022-02-03	2022-08-03
007-014	RF Cable 18-40 GHz 6m	R286304009	1747364	Radiall	2022-02-03	2022-08-03
007-023	RF Cable 1m DC-40GHz	PE360-100CM	-	Pasternack	2022-02-03	2022-08-03
007-018	RF Cable 1-9.5GHz 1.2m	0500990991200KE	-	Radiall	2022-02-03	2022-08-03
256-000	RF Cable 18GHz	UFB311A-0-0590- 50U50U	MFR 64639 223230- 002	Micro-Coax	N/A	N/A
325-000	Temp & Humidity Logger	RA12E-TH1-RAS	RA12-B9B7C6	Avtech	2022-01-17	2024-01-17
295-000	Communication tester	CMW500	147712	Rohde & Schwarz	N/A	N/A
320-000	Communication tester	CMW500	158429	Rohde & Schwarz	2020-04-15	2022-04-15

### A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the table below with a coverage factor of  $k = 2$  to indicate a 95% level of confidence:

Measurement type	Uncertainty	Unit
Tx Radiated test < 1GHz	$\pm 6.07$	dB
Tx Radiated test 1GHz - 40 GHz	$\pm 6.04$	dB

# Annex B. Test Results

The herein test results were performed by:

Test case measurement	Test Personnel
Tx spurious emissions	R.Simonini, N.Bui

## 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 $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1 MHz is required.																																		
WCDMA IV LTE 4 LTE 66	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 $43 + 10 \log_{10} p$ (watts) dB.																																		
WCDMA V LTE 5 LTE 26	22.917, 2.1053 90.691, 22.917, 2.1053	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 $43 + 10 \log_{10} p$ (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.																																		
LTE 12 LTE 13 LTE 17	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) $76 + 10 \log_{10} p$ (watts), dB, for base and fixed equipment, and  (ii) $65 + 10 \log_{10} p$ (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.																																		
LTE 30	27.53 (a)(4), 2.1053	195 ch.5.6.2	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;	<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Attenuation (dB)</th> </tr> </thead> <tbody> <tr><td>&lt;2200</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> <tr><td>2200 - 2288</td><td><math>70 + 10 \log_{10}(p)</math></td></tr> <tr><td>2288 - 2292</td><td><math>67 + 10 \log_{10}(p)</math></td></tr> <tr><td>2292 - 2296</td><td><math>61 + 10 \log_{10}(p)</math></td></tr> <tr><td>2296 - 2300</td><td><math>55 + 10 \log_{10}(p)</math></td></tr> <tr><td>2300 - 2305</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> <tr><td>2305 - 2320</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> <tr><td>2320 - 2324</td><td><math>55 + 10 \log_{10}(p)</math></td></tr> <tr><td>2324 - 2328</td><td><math>61 + 10 \log_{10}(p)</math></td></tr> <tr><td>2328 - 2337</td><td><math>67 + 10 \log_{10}(p)</math></td></tr> <tr><td>2337 - 2341</td><td><math>61 + 10 \log_{10}(p)</math></td></tr> <tr><td>2341 - 2345</td><td><math>55 + 10 \log_{10}(p)</math></td></tr> <tr><td>2345 - 2360</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> <tr><td>2360 - 2365</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> <tr><td>2365 - 2395</td><td><math>70 + 10 \log_{10}(p)</math></td></tr> <tr><td>&gt;2395</td><td><math>43 + 10 \log_{10}(p)</math></td></tr> </tbody> </table>	Frequency (MHz)	Attenuation (dB)	<2200	$43 + 10 \log_{10}(p)$	2200 - 2288	$70 + 10 \log_{10}(p)$	2288 - 2292	$67 + 10 \log_{10}(p)$	2292 - 2296	$61 + 10 \log_{10}(p)$	2296 - 2300	$55 + 10 \log_{10}(p)$	2300 - 2305	$43 + 10 \log_{10}(p)$	2305 - 2320	$43 + 10 \log_{10}(p)$	2320 - 2324	$55 + 10 \log_{10}(p)$	2324 - 2328	$61 + 10 \log_{10}(p)$	2328 - 2337	$67 + 10 \log_{10}(p)$	2337 - 2341	$61 + 10 \log_{10}(p)$	2341 - 2345	$55 + 10 \log_{10}(p)$	2345 - 2360	$43 + 10 \log_{10}(p)$	2360 - 2365	$43 + 10 \log_{10}(p)$	2365 - 2395	$70 + 10 \log_{10}(p)$	>2395	$43 + 10 \log_{10}(p)$
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			(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.	
LTE 7 LTE 38 LTE 41	27.53 (m), 2.1053	199-ch.4.5	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 than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz.	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) $40 + 10 \log_{10} p$ from the channel edges to 5 MHz away (ii) $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and (iii) $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges  In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz, and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

### B.1.2 Test procedure

The setup described in Test & System Description section was used to measure the radiated spurious emissions. Depending on 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 360° and for both Vertical and Horizontal polarizations.

### B.1.3 Test Results

#### B.1.3.1 WCDMA

##### WCDMA 2

**30 MHz to 26.5 GHz - Radiated Spurious  
WCDMA 2- QPSK - Low channel – 1852.4 MHz**

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
995.2	-54.2	-13.0	41.2
3033.0	-38.6	-13.0	25.6
3388.0	-37.9	-13.0	24.9
6868.5	-49.7	-13.0	36.7
16407.6	-36.9	-13.0	23.9
18300.8	-57.6	-13.0	44.6

##### WCDMA 4

**30 MHz to 26.5 GHz - Radiated Spurious  
WCDMA 4- QPSK - Mid channel – 1732.5 MHz**

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
975.7	-54.2	-13.0	41.2
1700.0	-42.8	-13.0	29.8
1704.5	-41.5	-13.0	28.5
3463.3	-54.0	-13.0	41.0
6609.1	-50.1	-13.0	37.1
16430.0	-37.0	-13.0	24.0

**WCDMA 5**

30 MHz to 9.5 GHz - Radiated Spurious WCDMA 5- QPSK - Mid channel – 836.5 MHz			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
960.8	-39.7	-13.0	26.7
1650.5	-63.5	-13.0	50.5
1653.7	-62.6	-13.0	49.6
1671.8	-60.5	-13.0	47.5
1674.1	-60.4	-13.0	47.4
6789.2	-50.5	-13.0	37.5

**B.1.3.2 LTE**
**LTE 2**

30MHz to 26.5GHz - Radiated Spurious LTE 2- QPSK – High channel – 1909.3 MHz BW 1.4 MHz– RB 1			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
1000.0	-53.7	-13.0	40.7
1991.0	-41.3	-13.0	28.3
3809.8	-52.4	-13.0	39.4
5714.6	-50.1	-13.0	37.1
7619.9	-48.3	-13.0	35.3
9524.2	-47.6	-13.0	34.6
16385.2	-36.8	-13.0	23.8
18648.8	-57.2	-13.0	44.2

**LTE 5**

<b>30MHz to 9.5GHz - Radiated Spurious                      LTE 5- QPSK – Mid channel – 900 MHz                      BW 1.4 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
970.1	-40.2	-13.0	27.2
1249.8	-62.2	-13.0	49.2
1663.9	-53.9	-13.0	40.9
2496.4	-54.3	-13.0	41.3
6037.5	-51.5	-13.0	38.5
8035.0	-49.2	-13.0	36.2

**LTE 7**

<b>30MHz to 40GHz - Radiated Spurious                      LTE 7- QPSK – High channel – 2567.5 MHz                      BW 5 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
969.1	-54.2	-25.0	29.2
3372.0	-38.1	-25.0	13.2
6922.0	-49.0	-25.0	24.0
16401.8	-36.6	-25.0	11.7
17794.6	-36.8	-25.0	11.8
25837.0	-54.8	-25.0	29.8



**LTE 12**

<b>30MHz to 9.5GHz - Radiated Spurious                      LTE 12 - QPSK - Mid channel – 707.5 MHz                      BW 1.4 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
968.2	-39.9	-13.0	26.9
1250.2	-62.5	-13.0	49.5
1413.7	-56.9	-13.0	43.9
2120.8	-53.6	-13.0	40.6
6026.8	-51.7	-13.0	38.7
7271.1	-51.3	-13.0	38.3

**LTE 13**

<b>30MHz to 9.5GHz - Radiated Spurious                      LTE 13 - QPSK - Mid channel – 782 MHz                      BW 5 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
971.2	-40.6	-13.0	27.6
1187.6	-62.9	-13.0	49.9
1559.5	-59.1	-40.0	19.1
2339.5	-42.6	-13.0	29.6
6027.8	-51.5	-13.0	38.5
6919.6	-50.2	-13.0	37.2

**LTE 26**

<b>30MHz to 9.5GHz - Radiated Spurious                      LTE 26 - QPSK - Mid channel – 831.5 MHz                      BW 1.4 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
983.7	-40.2	-13.0	27.2
1187.6	-62.9	-13.0	49.9
1658.4	-53.4	-13.0	40.4
2488.0	-52.3	-13.0	39.3
5914.9	-52.3	-13.0	39.3
6581.6	-50.5	-13.0	37.5

**LTE 30**

<b>30MHz to 26.5GHz - Radiated Spurious                      LTE 30 - QPSK - Mid channel – 2310 MHz                      BW 5 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
970.8	-53.9	-40.0	13.9
3333.5	-48.3	-40.0	8.3
4616.0	-48.9	-40.0	8.9
5971.0	-51.0	-40.0	11.0
6163.4	-50.1	-40.0	10.1
4616.0	-48.9	-40.0	8.9
6923.4	-56.9	-40.0	16.9
9231.4	-51.9	-40.0	11.9
13847.2	-57.1	-40.0	17.1
22726.0	-55.7	-40.0	15.7

**LTE 66**

<b>30MHz to 26.5GHz - Radiated Spurious                      LTE 66 - QPSK - Mid channel – 1745 MHz                      BW 1.4 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
997.8	-54.2	-13.0	41.2
3489.1	-51.3	-13.0	38.3
5233.8	-51.0	-13.0	38.0
6978.0	-45.2	-13.0	32.2
10467.4	-44.0	-13.0	31.0
16404.7	-36.7	-13.0	23.7

**LTE 41**

<b>30MHz to 40GHz - Radiated Spurious                      LTE 41 - QPSK - High channel – 2687.5 MHz                      BW 5 MHz– RB 1</b>			
Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
993.7	-57.9	-25.0	32.9
3355.5	-48.8	-25.0	23.8
5366.5	-51.2	-25.0	26.2
8049.0	-45.9	-25.0	20.9
16723.0	-38.4	-25.0	13.4
25821.0	-56.2	-25.0	31.2