Prüfbericht-Nr.: *Test report no.:*	CN23MVS1 (P27-WWAN) 001	**Auftrags-Nr.:** *Order no.*:	48218163	Seite 1 von 33 *Page 1 of 33*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2023-07-12	
Auftraggeber: *Client:*	Wistron Corporation 21F., No. 88, Sec. 1, HsinTai 5th Rd., Hsichih Dist, New Taipei City 221, Taiwan			
Prüfgegenstand: *Test item:*	R5			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	LVR5			
Auftrags-Inhalt: *Order content*:	FCC Part 27 Test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 27 Subpart F, H, L			

Wareneingangsdatum: *Date of sample receipt:*	2023-05-05
Prüfmuster-Nr.: *Test sample no:*	A003468922-002 A003468922-009
Prüfzeitraum: *Testing period:*	2023-05-22 - 2023-08-11
Ort der Prüfung: *Place of testing:*	EMC/RF Taipei Testing Site
Prüflaboratorium: *Testing laboratory:*	Taipei Testing Laboratories
Prüfergebnis*: *Test result*:*	Pass

überprüft von: *compiled by:*	David Huang	**genehmigt von:** authorized by:	Brenda Chen
Datum: *Date:* 2023-08-14		**Ausstellungsdatum:** *Issue date:* 2023-08-14	
Stellung / *Position:*	David Huang Project Manager	**Stellung** / *Position:*	Senior Project Manager

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

Report Section	FCC Clause	Test Item	Support Band	Result
5.1.1	2.1046	Conducted Output Power	-	Pass
	27.50(c)(10)	Effective Radiated Power	Band 12	Pass
	27.50(b)(10)		Band 13	Pass
	27.50(d)(4)	Effective Isotropically Radiated Power	Band 4 Band 66	Pass
5.1.2	2.1055 27.54	Frequency Stability	-	Pass
5.1.3	27.50(d)(5)	Peak to Average Ratio	-	Pass
5.1.4	2.1049	Occupied Bandwidth and 26 dB Bandwidth	-	Pass
5.1.5	2.1051	Conducted Band Edge & Emission Mask	-	Pass
	27.53(h)		Band 4 Band 66	Pass
	27.53(g)		Band 12	Pass
	27.53(c)(2)(4)		Band 13	Pass
5.1.6	2.1051	Conducted Spurious Emissions	-	Pass
	27.53(h)		Band 4 Band 66	Pass
	27.53(g)		Band 12	Pass
	27.53(c)(2)&(f)		Band 13	Pass
5.1.7	2.1053	Radiated Spurious Emissions	-	Pass
	27.53(h)		Band 4 Band 66	Pass
	27.53(g)		Band 12	Pass
	27.53(c)(2)&(f)		Band 13	Pass

Note:

1. The mark "-" means that the standard applied to all the bands.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

Contents

HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN23MVS1 (P27-WWAN) 001	Original Release	2023-08-14

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:
Appendix A - Test Result of Conducted
Appendix B - Test Result of Radiated Spurious Emissions
Appendix SP - Photographs Test Setup
Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47 CFR Part 2
FCC 47 CFR Part 27
KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-E 2016
ANSI C63.26-2015

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of k=2 to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.32 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.31 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.53 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.50 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a R5. It contains a WWAN compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	R5
Type Identification	LVR5
FCC ID	PU5-LVR5

Technical Specification of EUT

Item	EUT information	
Operating Frequency	LTE Band 4 (1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 12 (1.4 MHz)	699.7 ~ 715.3 MHz
	LTE Band 12 (3 MHz)	700.5 ~ 714.5 MHz
	LTE Band 12 (5 MHz)	701.5 ~ 713.5 MHz
	LTE Band 12 (10 MHz)	704.0 ~ 711.0 MHz
	LTE Band 13 (5 MHz)	779.5 ~ 784.5 MHz
	LTE Band 13 (10 MHz)	782.0 MHz
	LTE Band 66 (1.4 MHz)	1710.7 ~ 1779.3 MHz
	LTE Band 66 (3 MHz)	1711.5 ~ 1778.5 MHz
	LTE Band 66 (5 MHz)	1712.5 ~ 1777.5 MHz
	LTE Band 66 (10 MHz)	1715.0 ~ 1775.0 MHz
	LTE Band 66 (15 MHz)	1717.5 ~ 1772.5 MHz
	LTE Band 66 (20 MHz)	1720.0 ~ 1770.0 MHz
Modulation	LTE	QPSK, 16QAM
Operation Voltage	4.45 Vdc (Battery) 5 Vdc (Charging Cradle)	

Item	EUT information	
Antenna Typ	Coupling Feed antenna	
Antenna Gain (dBi)	LTE Band 4	0.46
	LTE Band 12	-4.11
	LTE Band 13	-3.2
	LTE Band 66	0.7
Accessory Device	Refer to 4.3	

Maximum ERP/EIRP and Emission Designator

Item	Band	Result
Maximum ERP/EIRP (dBm)	LTE Band 4 (1.4 MHz)	22.95
	LTE Band 4 (3 MHz)	22.96
	LTE Band 4 (5 MHz)	22.99
	LTE Band 4 (10 MHz)	22.96
	LTE Band 4 (15 MHz)	22.97
	LTE Band 4 (20 MHz)	23.42
	LTE Band 12 (1.4 MHz)	18.47
	LTE Band 12 (3 MHz)	18.45
	LTE Band 12 (5 MHz)	18.48
	LTE Band 12 (10 MHz)	18.51
	LTE Band 13 (5 MHz)	18.38
	LTE Band 13 (10 MHz)	18.40
	LTE Band 66 (1.4 MHz)	23.43
	LTE Band 66 (3 MHz)	23.46
	LTE Band 66 (5 MHz)	23.46
	LTE Band 66 (10 MHz)	23.39
	LTE Band 66 (15 MHz)	23.43
	LTE Band 66 (20 MHz)	23.68

Item	Band	Result
Emission Designator	LTE Band 4 (1.4 MHz)	1M02G7D
	LTE Band 4 (3 MHz)	2M76D7W
	LTE Band 4 (5 MHz)	4M54D7W
	LTE Band 4 (10 MHz)	8M93G7D
	LTE Band 4 (15 MHz)	13M4G7D
	LTE Band 4 (20 MHz)	17M9G7D
	LTE Band 12 (1.4 MHz)	1M10G7D
	LTE Band 12 (3 MHz)	2M76D7W
	LTE Band 12 (5 MHz)	4M54D7W
	LTE Band 12 (10 MHz)	8M99G7D
	LTE Band 13 (5 MHz)	2M54G7D
	LTE Band 13 (10 MHz)	8M91G7D
	LTE Band 66 (1.4 MHz)	1M10G7D
	LTE Band 66 (3 MHz)	2M76D7W
	LTE Band 66 (5 MHz)	4M52D7W
	LTE Band 66 (10 MHz)	8M95G7D
	LTE Band 66 (15 MHz)	13M4G7D
	LTE Band 66 (20 MHz)	17M9G7D

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples make a communication with MT8821C which makes it possible to control them.

The samples were used as follows:
A003468922-002
A003468922-009
Full test was applied on all test modes, but only worst case was shown.

Effective Radiated Power (ERP) / Effective Isotropically Radiated Power (EIRP)
☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	1.4 MHz	19957 to 20393	19957, 20175, 20393	QPSK, 16QAM	1 RB
		3 MHz	19965 to 20385	19965, 20175, 20385	QPSK, 16QAM	1 RB
		5 MHz	19975 to 20375	19975, 20175, 20375	QPSK, 16QAM	1 RB
		10 MHz	20000 to 20350	20000, 20175, 20350	QPSK, 16QAM	1 RB
		15 MHz	20025 to 20325	20025, 20175, 20325	QPSK, 16QAM	1 RB
		20 MHz	20050 to 20300	20050, 20175, 20300	QPSK, 16QAM	1 RB
-	LTE Band 12	1.4 MHz	23017 to 23173	23017, 23095, 23173	QPSK, 16QAM	1 RB
		3 MHz	23025 to 23165	23025, 23095, 23165	QPSK, 16QAM	1 RB
		5 MHz	23035 to 23155	23035, 23095, 23155	QPSK, 16QAM	1 RB
		10 MHz	23060 to 23130	23060, 23095, 23130	QPSK, 16QAM	1 RB
-	LTE Band 13	5 MHz	23205 to 23255	23205, 23230, 23255	QPSK, 16QAM	1 RB
		10 MHz	23230	23230	QPSK, 16QAM	1 RB
-	LTE Band 66	1.4 MHz	131979 to 132665	131979, 132322, 132665	QPSK, 16QAM	1 RB
		3 MHz	131987 to 132657	131987, 132322, 132657	QPSK, 16QAM	1 RB
		5 MHz	131997 to 132647	131997, 132322, 132647	QPSK, 16QAM	1 RB
		10 MHz	132022 to 132622	132022, 132322, 132622	QPSK, 16QAM	1 RB
		15 MHz	132047 to 132597	132047, 132322, 132597	QPSK, 16QAM	1 RB
		20 MHz	132072 to 132572	132072, 132322, 132572	QPSK, 16QAM	1 RB

Frequency Stability

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	20 MHz	20050 to 20300	20175	QPSK	Full RB
-	LTE Band 12	10 MHz	23060 to 23130	23095	QPSK	Full RB
-	LTE Band 13	10 MHz	23230	23230	QPSK	Full RB
-	LTE Band 66	15 MHz	132047 to 132597	132322	QPSK	Full RB

Peak to Average Ratio

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	1.4 MHz	19957 to 20393	19957, 20175, 20393	QPSK, 16QAM	1 RB
		3 MHz	19965 to 20385	19965, 20175, 20385	QPSK, 16QAM	1 RB
		5 MHz	19975 to 20375	19975, 20175, 20375	QPSK, 16QAM	1 RB
		10 MHz	20000 to 20350	20000, 20175, 20350	QPSK, 16QAM	1 RB
		15 MHz	20025 to 20325	20025, 20175, 20325	QPSK, 16QAM	1 RB
		20 MHz	20050 to 20300	20050, 20175, 20300	QPSK, 16QAM	1 RB
-	LTE Band 12	1.4 MHz	23017 to 23173	23017, 23095, 23173	QPSK, 16QAM	1 RB
		3 MHz	23025 to 23165	23025, 23095, 23165	QPSK, 16QAM	1 RB
		5 MHz	23035 to 23155	23035, 23095, 23155	QPSK, 16QAM	1 RB
		10 MHz	23060 to 23130	23060, 23095, 23130	QPSK, 16QAM	1 RB
-	LTE Band 13	5 MHz	23205 to 23255	23205, 23230, 23255	QPSK, 16QAM	1 RB
		10 MHz	23230	23230	QPSK, 16QAM	1 RB
-	LTE Band 17	5 MHz	23755 to 23825	23755, 23790, 23825	QPSK, 16QAM	1 RB
		10 MHz	23780 to 23800	23780, 23790, 23800	QPSK, 16QAM	1 RB
-	LTE Band 66	1.4 MHz	131979 to 132665	131979, 132322, 132665	QPSK, 16QAM	1 RB
		3 MHz	131987 to 132657	131987, 132322, 132657	QPSK, 16QAM	1 RB
		5 MHz	131997 to 132647	131997, 132322, 132647	QPSK, 16QAM	1 RB
		10 MHz	132022 to 132622	132022, 132322, 132622	QPSK, 16QAM	1 RB
		15 MHz	132047 to 132597	132047, 132322, 132597	QPSK, 16QAM	1 RB
		20 MHz	132072 to 132572	132072, 132322, 132572	QPSK, 16QAM	1 RB

Occupied Bandwidth and 26 dB Bandwidth

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	1.4 MHz	19957 to 20393	19957, 20175, 20393	QPSK, 16QAM	Full RB
		3 MHz	19965 to 20385	19965, 20175, 20385	QPSK, 16QAM	Full RB
		5 MHz	19975 to 20375	19975, 20175, 20375	QPSK, 16QAM	Full RB
		10 MHz	20000 to 20350	20000, 20175, 20350	QPSK	Full RB
		15 MHz	20025 to 20325	20025, 20175, 20325	QPSK	Full RB
		20 MHz	20050 to 20300	20050, 20175, 20300	QPSK	Full RB
-	LTE Band 12	1.4 MHz	23017 to 23173	23017, 23095, 23173	QPSK, 16QAM	Full RB
		3 MHz	23025 to 23165	23025, 23095, 23165	QPSK, 16QAM	Full RB
		5 MHz	23035 to 23155	23035, 23095, 23155	QPSK, 16QAM	Full RB
		10 MHz	23060 to 23130	23060, 23095, 23130	QPSK	Full RB
-	LTE Band 13	5 MHz	23205 to 23255	23205, 23230, 23255	QPSK, 16QAM	Full RB
		10 MHz	23230	23230	QPSK	Full RB
-	LTE Band 66	1.4 MHz	131979 to 132665	131979, 132322, 132665	QPSK, 16QAM	Full RB
		3 MHz	131987 to 132657	131987, 132322, 132657	QPSK, 16QAM	Full RB
		5 MHz	131997 to 132647	131997, 132322, 132647	QPSK, 16QAM	Full RB
		10 MHz	132022 to 132622	132022, 132322, 132622	QPSK	Full RB
		15 MHz	132047 to 132597	132047, 132322, 132597	QPSK	Full RB
		20 MHz	132072 to 132572	132072, 132322, 132572	QPSK	Full RB

Band Edge & Emission Mask

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	1.4 MHz	19957 to 20393	19957, 20393	QPSK	1 RB / Full RB
		3 MHz	19965 to 20385	19965, 20385	QPSK	1 RB / Full RB
		5 MHz	19975 to 20375	19975, 20375	QPSK	1 RB / Full RB
		10 MHz	20000 to 20350	20000, 20350	QPSK	1 RB / Full RB
		15 MHz	20025 to 20325	20025, 20325	QPSK	1 RB / Full RB
		20 MHz	20050 to 20300	20050, 20300	QPSK	1 RB / Full RB
-	LTE Band 12	1.4 MHz	23017 to 23173	23017, 23173	QPSK	1 RB / Full RB
		3 MHz	23025 to 23165	23025, 23165	QPSK	1 RB / Full RB
		5 MHz	23035 to 23155	23035, 23155	QPSK	1 RB / Full RB
		10 MHz	23060 to 23130	23060, 23130	QPSK	1 RB / Full RB
-	LTE Band 13	5 MHz	23205 to 23255	23205, 23255	QPSK	1 RB / Full RB
		10 MHz	23230	23230	QPSK	1 RB / Full RB
-	LTE Band 66	1.4 MHz	131979 to 132665	131979, 132665	QPSK	1 RB / Full RB
		3 MHz	131987 to 132657	131987, 132657	QPSK	1 RB / Full RB
		5 MHz	131997 to 132647	131997, 132647	QPSK	1 RB / Full RB
		10 MHz	132022 to 132622	132022, 132622	QPSK	1 RB / Full RB
		15 MHz	132047 to 132597	132047, 132597	QPSK	1 RB / Full RB
		20 MHz	132072 to 132572	132072, 132572	QPSK	1 RB / Full RB

Conducted Spurious Emissions

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode
-	LTE Band 4	1.4 MHz	19957 to 20393	19957, 20175, 20393	QPSK	1 RB
		3 MHz	19965 to 20385	19965, 20175, 20385	QPSK	1 RB
		5 MHz	19975 to 20375	19975, 20175, 20375	QPSK	1 RB
		10 MHz	20000 to 20350	20000, 20175, 20350	QPSK	1 RB
		15 MHz	20025 to 20325	20025, 20175, 20325	QPSK	1 RB
		20 MHz	20050 to 20300	20050, 20175, 20300	QPSK	1 RB
-	LTE Band 12	1.4 MHz	23017 to 23173	23017, 23095, 23173	QPSK	1 RB
		3 MHz	23025 to 23165	23025, 23095, 23165	QPSK	1 RB
		5 MHz	23035 to 23155	23035, 23095, 23155	QPSK	1 RB
		10 MHz	23060 to 23130	23060, 23095, 23130	QPSK	1 RB
-	LTE Band 13	5 MHz	23205 to 23255	23205, 23230, 23255	QPSK	1 RB
		10 MHz	23230	23230	QPSK	1 RB
-	LTE Band 66	1.4 MHz	131979 to 132665	131979, 132322, 132665	QPSK	1 RB
		3 MHz	131987 to 132657	131987, 132322, 132657	QPSK	1 RB
		5 MHz	131997 to 132647	131997, 132322, 132647	QPSK	1 RB
		10 MHz	132022 to 132622	132022, 132322, 132622	QPSK	1 RB
		15 MHz	132047 to 132597	132047, 132322, 132597	QPSK	1 RB
		20 MHz	132072 to 132572	132072, 132322, 132572	QPSK	1 RB

Radiated Spurious Emissions

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Band	Channel Bandwidth	Available Channel	Tested Channel	Modulation	Mode	Postion
-	LTE Band 4	20 MHz	20050 to 20300	20050, 20175, 20300	QPSK	1 RB	Z-plane
	LTE Band 12	10 MHz	23060 to 23130	23060, 23095, 23130	QPSK	1 RB	Y-plane
	LTE Band 13	10 MHz	23230	23230	QPSK	1 RB	Y-plane
	LTE Band 66	20 MHz	32072 to 132572	132072, 132322, 132572	QPSK	1 RB	Z-plane

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
ERP / EIRP	18-23 °C	58-69 %	Andy Chen
Frequency Stability	18-23 °C	58-69 %	Andy Chen
Peak to Average Ratio	18-23 °C	58-69 %	Andy Chen
Occupied Bandwidth and 26 dB Bandwidth	18-23 °C	58-69 %	Andy Chen
Band Edge & Emission Mask	18-23 °C	58-69 %	Andy Chen
Conducted Spurious Emissions	18-23 °C	58-69 %	Andy Chen
Radiated Spurious Emissions	22.6-24.5 °C	52-54 %	Roger Liao

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

No.	Product	Brand	Model	Description
-	Battery	APACK	1-00382-R5-01	4.45 Vdc, 600 mAh

Support Unit

None

4.4 Test Setup Diagram

5. Test Results

5.1 Transmitter Requirement & Test Suites

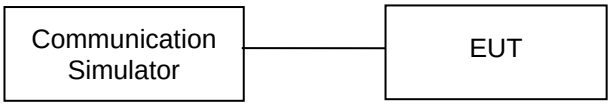
5.1.1 Conducted Output Power and ERP/EIRP

Limit

According to §27.50(d)(4): The EIRP must not exceed 1 Watts.
According to §27.50(c)(10): The ERP must not exceed 3 Watts.
According to §27.50(b)(10): The ERP must not exceed 3 Watts.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Radio Communication Analyzer	Anritsu	MT8821C	6262044753	2022/7/7	2023/7/6	2023/5/22	2023/6/5

Test Procedures

The EUT was set up for the maximum power with WWAN link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.
EIRP = Conducted Power + Antenna Gain
ERP = EIRP – 2.15

Test Result

<Conducted Output Power>

LTE Band 4								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		19957 / 1710.7	20175 / 1732.5	20393 / 1754.3		19965 / 1711.5	20175 / 1732.5	20385 / 1753.5
QPSK	1/0	21.98	22.20	22.34	1/0	22.08	22.37	22.38
	1/2	22.34	22.46	22.34	1/7	22.50	22.48	22.34
	1/5	22.13	22.21	22.11	1/14	22.15	22.44	22.35
	3/0	22.06	22.17	21.86	8/0	21.04	21.18	21.12
	3/1	21.86	22.49	21.91	8/3	21.08	21.22	21.05
	3/3	21.95	22.13	22.07	8/7	21.06	21.15	21.12
	6/0	20.80	21.04	20.89	15/0	20.95	21.15	21.10
16QAM	1/0	20.78	21.10	20.90	1/0	20.95	21.07	21.08
	1/2	20.79	20.96	20.86	1/7	20.94	21.12	21.00
	1/5	20.85	21.05	20.93	1/14	20.96	21.12	21.06
	3/0	20.87	21.00	21.21	8/0	19.88	20.35	20.11
	3/1	21.15	21.14	21.22	8/3	20.11	20.40	20.22
	3/3	20.88	21.18	21.26	8/7	20.22	20.41	20.32
	6/0	19.64	20.09	19.95	15/0	19.84	20.27	20.03
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		19975 / 1712.5	20175 / 1732.5	20375 / 1752.5		20000 / 1715	20175 / 1732.5	20350 / 1750
QPSK	1/0	22.11	22.28	22.50	1/0	21.97	22.18	22.46
	1/12	22.31	22.42	22.53	1/24	22.31	22.28	22.50
	1/24	22.26	22.45	22.40	1/49	22.23	22.28	22.31
	12/0	20.97	21.18	21.19	25/0	20.88	21.00	21.24
	12/6	21.01	21.20	21.21	25/12	21.02	21.15	21.07
	12/13	20.96	21.24	21.16	25/25	20.99	21.16	21.16
	25/0	20.97	21.21	21.16	50/0	20.89	21.17	21.13
16QAM	1/0	20.75	21.08	21.05	1/0	20.91	20.85	21.06
	1/12	20.98	21.12	21.10	1/24	20.83	21.04	21.04
	1/24	20.86	21.11	20.99	1/49	20.93	21.01	21.10
	12/0	19.95	20.09	20.08	25/0	19.97	20.32	20.38
	12/6	19.98	20.29	20.21	25/12	20.04	20.24	20.16
	12/13	20.15	20.27	20.36	25/25	20.07	20.38	20.22
	25/0	20.17	20.25	20.26				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		20025 / 1717.5	20175 / 1732.5	20325 / 1747.5		20050 / 1720	20175 / 1732.5	20300 / 1745
QPSK	1/0	21.96	22.14	22.47	1/0	22.75	22.96	22.94
	1/37	21.95	22.51	22.47	1/49	22.53	22.44	22.49
	1/74	21.77	21.88	22.04	1/99	22.34	22.31	22.43
	36/0	20.60	20.78	20.86	50/0	21.12	21.07	21.27
	36/19	20.73	20.77	20.96	50/24	21.29	21.39	21.31
	36/39	20.75	20.76	20.77	50/50	21.12	21.10	21.23
	75/0	20.74	20.71	20.89	100/0	21.13	21.15	21.33
16QAM	1/0	20.57	20.71	20.78	1/0	20.76	21.05	21.39
	1/37	20.61	21.00	20.77	1/49	21.08	21.11	21.15
	1/74	20.65	20.59	20.80	1/99	21.07	21.10	21.68

LTE Band 12								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		23017 / 699.7	23095 / 707.5	23173 / 715.3		23025 / 700.5	23095 / 707.5	23165 / 714.5
QPSK	1/0	23.50	23.64	23.81	1/0	23.58	23.64	23.66
	1/2	23.92	23.69	23.75	1/7	23.29	23.89	23.90
	1/5	23.63	23.66	23.73	1/14	23.66	23.70	23.66
	3/0	23.45	23.69	23.40	8/0	22.35	22.48	22.76
	3/1	23.68	23.85	23.87	8/3	22.60	22.66	22.81
	3/3	23.43	23.56	23.64	8/7	22.28	22.65	22.82
	6/0	22.50	22.54	22.73	15/0	22.46	22.63	22.80
16QAM	1/0	22.34	22.43	22.96	1/0	22.23	22.37	22.62
	1/2	22.09	22.50	22.48	1/7	22.15	22.57	22.74
	1/5	22.36	22.57	22.52	1/14	22.29	22.48	22.57
	3/0	22.84	22.79	22.64	8/0	21.63	21.58	21.79
	3/1	22.73	22.62	22.88	8/3	21.75	21.78	21.82
	3/3	22.38	22.71	22.58	8/7	21.43	21.97	21.90
	6/0	21.40	21.57	21.38	15/0	21.58	21.59	21.66
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size	Channel / Frequency (MHz)			RB Size	Channel / Frequency (MHz)		
		23035 / 701.5	23095 / 707.5	23155 / 713.5		23060 / 704	23095 / 707.5	23130 / 711
QPSK	1/0	23.58	23.54	23.63	1/0	23.45	23.52	23.53
	1/12	23.57	23.84	23.93	1/24	23.55	23.78	23.96
	1/24	23.47	23.72	23.61	1/49	23.59	23.57	23.56
	12/0	22.50	22.53	22.63	25/0	22.34	22.39	22.61
	12/6	22.43	22.60	22.51	25/12	22.39	22.56	22.61
	12/13	22.40	22.62	22.65	25/25	22.37	22.58	22.68
	25/0	22.58	22.61	22.63	50/0	22.33	22.56	22.61
16QAM	1/0	22.28	22.14	22.75	1/0	22.19	22.15	22.38
	1/12	22.00	22.58	22.39	1/24	22.29	22.45	22.46
	1/24	22.11	22.35	22.34	1/49	22.47	22.29	22.22
	12/0	21.16	21.41	21.42	25/0	21.38	21.44	21.57
	12/6	21.40	21.65	21.66	25/12	21.37	21.62	21.59
	12/13	21.42	21.38	21.71	25/25	21.44	21.55	21.54
	25/0	21.37	21.78	21.60				

LTE Band 13								
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size	Channel / Frequency (MHz)			RB Size	Channel / Frequency (MHz)		
		23205 / 779.5	23230 / 782	23255 / 784.5			23230 / 782	
QPSK	1/0	23.39	23.48	23.56	1/0		23.60	
	1/12	23.83	23.71	23.82	1/24		23.85	
	1/24	23.40	23.69	23.57	1/49		23.60	
	12/0	22.27	22.36	22.44	25/0		22.63	
	12/6	22.41	22.48	22.52	25/12		22.68	
	12/13	22.40	22.42	22.34	25/25		22.58	
	25/0	22.39	22.47	22.36	50/0		22.40	
16QAM	1/0	22.14	22.17	22.57	1/0		22.17	
	1/12	22.61	22.12	22.39	1/24		22.38	
	1/24	22.31	22.35	22.25	1/49		22.20	
	12/0	21.44	21.21	21.56	25/0		21.40	
	12/6	21.58	21.46	21.49	25/12		21.30	
	12/13	21.23	21.51	21.46	25/25		21.28	
	25/0	21.39	21.56	21.48				

LTE Band 66								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		131979 / 1710.7	132322 / 1745	132665 / 1779.3		131987 / 1711.5	132322 / 1745	132657 / 1778.5
QPSK	1/0	22.23	22.73	22.42	1/0	22.05	22.57	22.28
	1/2	22.38	22.72	22.34	1/7	22.18	22.76	22.22
	1/5	22.44	22.66	22.47	1/14	22.12	22.65	22.30
	3/0	22.34	22.58	22.24	8/0	21.05	21.53	21.20
	3/1	22.42	22.51	22.39	8/3	21.13	21.43	21.16
	3/3	22.49	22.62	22.35	8/7	21.13	21.48	21.18
	6/0	21.24	21.46	21.21	15/0	21.06	21.46	21.20
16QAM	1/0	21.05	21.41	21.08	1/0	20.93	21.19	20.96
	1/2	21.07	21.25	21.14	1/7	20.91	21.16	20.63
	1/5	21.01	21.41	21.13	1/14	21.02	21.31	21.09
	3/0	21.27	21.66	21.15	8/0	20.05	20.25	19.94
	3/1	21.23	21.59	21.31	8/3	20.10	20.24	20.38
	3/3	21.56	21.58	21.26	8/7	20.05	20.59	20.20
	6/0	20.10	20.58	20.28	15/0	20.00	20.24	20.10
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		131997 / 1712.5	132322 / 1745	132647 / 1777.5		132022 / 1715	132322 / 1745	132622 / 1775
QPSK	1/0	22.28	22.59	22.39	1/0	22.06	22.52	22.19
	1/12	22.42	22.76	22.40	1/24	22.50	22.69	22.25
	1/24	22.49	22.69	22.36	1/49	22.27	22.66	22.12
	12/0	21.26	21.49	21.20	25/0	20.95	21.31	21.01
	12/6	21.20	21.53	21.30	25/12	21.08	21.34	20.96
	12/13	21.17	21.50	21.28	25/25	21.06	21.26	21.02
	25/0	21.17	21.46	21.40	50/0	21.07	21.30	20.98
16QAM	1/0	21.32	21.33	20.96	1/0	20.65	21.09	20.82
	1/12	21.01	20.98	20.86	1/24	20.89	21.05	20.96
	1/24	20.98	21.35	20.84	1/49	20.91	21.08	20.79
	12/0	20.30	20.48	20.20	25/0	20.00	20.37	20.06
	12/6	20.15	20.49	20.37	25/12	20.25	20.41	20.04
	12/13	20.27	20.42	20.26	25/25	20.08	20.42	20.10
	25/0	20.31	20.78	20.43				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		132047 / 1717.5	132322 / 1745	132597 / 1772.5		132072 / 1720	132322 / 1745	132572 / 1770
QPSK	1/0	21.77	22.30	21.94	1/0	22.80	22.98	22.70
	1/37	22.73	22.60	22.33	1/49	22.28	22.73	22.40
	1/74	22.16	22.20	21.97	1/99	22.32	22.75	22.54
	36/0	20.76	21.08	20.82	50/0	21.37	21.58	21.42
	36/19	20.88	21.15	20.88	50/24	21.57	21.56	21.40
	36/39	20.94	21.14	20.81	50/50	21.55	21.59	21.38
	75/0	20.90	21.12	20.86	100/0	21.51	21.62	21.29
16QAM	1/0	20.58	20.80	20.63	1/0	21.02	21.28	21.12
	1/37	20.68	20.50	20.73	1/49	21.31	21.14	21.22
	1/74	20.74	20.87	20.63	1/99	21.22	21.33	21.08

<ERP / EIRP>

LTE Band 4								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		19957 / 1710.7	20175 / 1732.5	20393 / 1754.3		19965 / 1711.5	20175 / 1732.5	20385 / 1753.5
QPSK	1/0	22.44	22.66	22.80	1/0	22.54	22.83	22.84
	1/2	22.80	22.92	22.80	1/7	22.96	22.94	22.80
	1/5	22.59	22.67	22.57	1/14	22.61	22.90	22.81
	3/0	22.52	22.63	22.32	8/0	21.50	21.64	21.58
	3/1	22.32	22.95	22.37	8/3	21.54	21.68	21.51
	3/3	22.41	22.59	22.53	8/7	21.52	21.61	21.58
	6/0	21.26	21.50	21.35	15/0	21.41	21.61	21.56
16QAM	1/0	21.24	21.56	21.36	1/0	21.41	21.53	21.54
	1/2	21.25	21.42	21.32	1/7	21.40	21.58	21.46
	1/5	21.31	21.51	21.39	1/14	21.42	21.58	21.52
	3/0	21.33	21.46	21.67	8/0	20.34	20.81	20.57
	3/1	21.61	21.60	21.68	8/3	20.57	20.86	20.68
	3/3	21.34	21.64	21.72	8/7	20.68	20.87	20.78
	6/0	20.10	20.55	20.41	15/0	20.30	20.73	20.49
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		19975 / 1712.5	20175 / 1732.5	20375 / 1752.5		20000 / 1715	20175 / 1732.5	20350 / 1750
QPSK	1/0	22.57	22.74	22.96	1/0	22.43	22.64	22.92
	1/12	22.77	22.88	22.99	1/24	22.77	22.74	22.96
	1/24	22.72	22.91	22.86	1/49	22.69	22.74	22.77
	12/0	21.43	21.64	21.65	25/0	21.34	21.46	21.70
	12/6	21.47	21.66	21.67	25/12	21.48	21.61	21.53
	12/13	21.42	21.70	21.62	25/25	21.45	21.62	21.62
	25/0	21.43	21.67	21.62	50/0	21.35	21.63	21.59
16QAM	1/0	21.21	21.54	21.51	1/0	21.37	21.31	21.52
	1/12	21.44	21.58	21.56	1/24	21.29	21.50	21.50
	1/24	21.32	21.57	21.45	1/49	21.39	21.47	21.56
	12/0	20.41	20.55	20.54	25/0	20.43	20.78	20.84
	12/6	20.44	20.75	20.67	25/12	20.50	20.70	20.62
	12/13	20.61	20.73	20.82	25/25	20.53	20.84	20.68
	25/0	20.63	20.71	20.72				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		20025 / 1717.5	20175 / 1732.5	20325 / 1747.5		20050 / 1720	20175 / 1732.5	20300 / 1745
QPSK	1/0	22.42	22.60	22.93	1/0	23.21	23.42	23.40
	1/37	22.41	22.97	22.93	1/49	22.99	22.90	22.95
	1/74	22.23	22.34	22.50	1/99	22.80	22.77	22.89
	36/0	21.06	21.24	21.32	50/0	21.58	21.53	21.73
	36/19	21.19	21.23	21.42	50/24	21.75	21.85	21.77
	36/39	21.21	21.22	21.23	50/50	21.58	21.56	21.69
	75/0	21.20	21.17	21.35	100/0	21.59	21.61	21.79
16QAM	1/0	21.03	21.17	21.24	1/0	21.22	21.51	21.85
	1/37	21.07	21.46	21.23	1/49	21.54	21.57	21.61
	1/74	21.11	21.05	21.26	1/99	21.53	21.56	22.14

LTE Band 12								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		23017 / 699.7	23095 / 707.5	23173 / 715.3		23025 / 700.5	23095 / 707.5	23165 / 714.5
QPSK	1/0	18.05	18.19	18.36	1/0	18.13	18.19	18.21
	1/2	18.47	18.24	18.30	1/7	17.84	18.44	18.45
	1/5	18.18	18.21	18.28	1/14	18.21	18.25	18.21
	3/0	18.00	18.24	17.95	8/0	16.90	17.03	17.31
	3/1	18.23	18.40	18.42	8/3	17.15	17.21	17.36
	3/3	17.98	18.11	18.19	8/7	16.83	17.20	17.37
	6/0	17.05	17.09	17.28	15/0	17.01	17.18	17.35
16QAM	1/0	16.89	16.98	17.51	1/0	16.78	16.92	17.17
	1/2	16.64	17.05	17.03	1/7	16.70	17.12	17.29
	1/5	16.91	17.12	17.07	1/14	16.84	17.03	17.12
	3/0	17.39	17.34	17.19	8/0	16.18	16.13	16.34
	3/1	17.28	17.17	17.43	8/3	16.30	16.33	16.37
	3/3	16.93	17.26	17.13	8/7	15.98	16.52	16.45
	6/0	15.95	16.12	15.93	15/0	16.13	16.14	16.21
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size	Channel / Frequency (MHz)			RB Size	Channel / Frequency (MHz)		
		23035 / 701.5	23095 / 707.5	23155 / 713.5		23060 / 704	23095 / 707.5	23130 / 711
QPSK	1/0	18.13	18.09	18.18	1/0	18.00	18.07	18.08
	1/12	18.12	18.39	18.48	1/24	18.10	18.33	18.51
	1/24	18.02	18.27	18.16	1/49	18.14	18.12	18.11
	12/0	17.05	17.08	17.18	25/0	16.89	16.94	17.16
	12/6	16.98	17.15	17.06	25/12	16.94	17.11	17.16
	12/13	16.95	17.17	17.2	25/25	16.92	17.13	17.23
	25/0	17.13	17.16	17.18	50/0	16.88	17.11	17.16
16QAM	1/0	16.83	16.69	17.30	1/0	16.74	16.70	16.93
	1/12	16.55	17.13	16.94	1/24	16.84	17.00	17.01
	1/24	16.66	16.90	16.89	1/49	17.02	16.84	16.77
	12/0	15.71	15.96	15.97	25/0	15.93	15.99	16.12
	12/6	15.95	16.20	16.21	25/12	15.92	16.17	16.14
	12/13	15.97	15.93	16.26	25/25	15.99	16.10	16.09
	25/0	15.92	16.33	16.15				

LTE Band 13								
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size	Channel / Frequency (MHz)			RB Size	Channel / Frequency (MHz)		
		23205 / 779.5	23230 / 782	23255 / 784.5			23230 / 782	
QPSK	1/0	17.94	18.03	18.11	1/0		18.15	
	1/12	18.38	18.26	18.37	1/24		18.40	
	1/24	17.95	18.24	18.12	1/49		18.15	
	12/0	16.82	16.91	16.99	25/0		17.18	
	12/6	16.96	17.03	17.07	25/12		17.23	
	12/13	16.95	16.97	16.89	25/25		17.13	
	25/0	16.94	17.02	16.91	50/0		16.95	
16QAM	1/0	16.69	16.72	17.12	1/0		16.72	
	1/12	17.16	16.67	16.94	1/24		16.93	
	1/24	16.86	16.90	16.80	1/49		16.75	
	12/0	15.99	15.76	16.11	25/0		15.95	
	12/6	16.13	16.01	16.04	25/12		15.85	
	12/13	15.78	16.06	16.01	25/25		15.83	
	25/0	15.94	16.11	16.03				

LTE Band 66								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		131979 / 1710.7	132322 / 1745	132665 / 1779.3		131987 / 1711.5	132322 / 1745	132657 / 1778.5
QPSK	1/0	22.93	23.43	23.12	1/0	22.75	23.27	22.98
	1/2	23.08	23.42	23.04	1/7	22.88	23.46	22.92
	1/5	23.14	23.36	23.17	1/14	22.82	23.35	23.00
	3/0	23.04	23.28	22.94	8/0	21.75	22.23	21.90
	3/1	23.12	23.21	23.09	8/3	21.83	22.13	21.86
	3/3	23.19	23.32	23.05	8/7	21.83	22.18	21.88
	6/0	21.94	22.16	21.91	15/0	21.76	22.16	21.90
16QAM	1/0	21.75	22.11	21.78	1/0	21.63	21.89	21.66
	1/2	21.77	21.95	21.84	1/7	21.61	21.86	21.33
	1/5	21.71	22.11	21.83	1/14	21.72	22.01	21.79
	3/0	21.97	22.36	21.85	8/0	20.75	20.95	20.64
	3/1	21.93	22.29	22.01	8/3	20.80	20.94	21.08
	3/3	22.26	22.28	21.96	8/7	20.75	21.29	20.90
	6/0	20.80	21.28	20.98	15/0	20.70	20.94	20.80
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		131997 / 1712.5	132322 / 1745	132647 / 1777.5		132022 / 1715	132322 / 1745	132622 / 1775
QPSK	1/0	22.98	23.29	23.09	1/0	22.76	23.22	22.89
	1/12	23.12	23.46	23.10	1/24	23.20	23.39	22.95
	1/24	23.19	23.39	23.06	1/49	22.97	23.36	22.82
	12/0	21.96	22.19	21.90	25/0	21.65	22.01	21.71
	12/6	21.90	22.23	22.00	25/12	21.78	22.04	21.66
	12/13	21.87	22.20	21.98	25/25	21.76	21.96	21.72
	25/0	21.87	22.16	22.10	50/0	21.77	22.00	21.68
16QAM	1/0	22.02	22.03	21.66	1/0	21.35	21.79	21.52
	1/12	21.71	21.68	21.56	1/24	21.59	21.75	21.66
	1/24	21.68	22.05	21.54	1/49	21.61	21.78	21.49
	12/0	21.00	21.18	20.90	25/0	20.70	21.07	20.76
	12/6	20.85	21.19	21.07	25/12	20.95	21.11	20.74
	12/13	20.97	21.12	20.96	25/25	20.78	21.12	20.80
	25/0	21.01	21.48	21.13				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		132047 / 1717.5	132322 / 1745	132597 / 1772.5		132072 / 1720	132322 / 1745	132572 / 1770
QPSK	1/0	22.47	23.00	22.64	1/0	23.50	23.68	23.40
	1/37	23.43	23.30	23.03	1/49	22.98	23.43	23.10
	1/74	22.86	22.90	22.67	1/99	23.02	23.45	23.24
	36/0	21.46	21.78	21.52	50/0	22.07	22.28	22.12
	36/19	21.58	21.85	21.58	50/24	22.27	22.26	22.10
	36/39	21.64	21.84	21.51	50/50	22.25	22.29	22.08
	75/0	21.60	21.82	21.56	100/0	22.21	22.32	21.99
16QAM	1/0	21.28	21.50	21.33	1/0	21.72	21.98	21.82
	1/37	21.38	21.20	21.43	1/49	22.01	21.84	21.92
	1/74	21.44	21.57	21.33	1/99	21.92	22.03	21.78

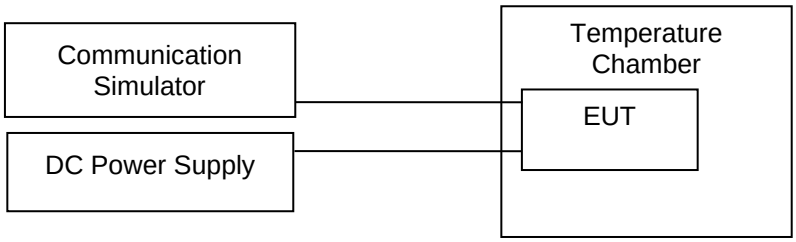
5.1.2 Frequency Stability

Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/5/22	2023/6/5
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2023/4/10	2024/4/8	2023/5/22	2023/6/5

Test Procedure

a. Device is placed at the temperature chamber. The temperature chamber could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

Test Results

<LTE Band 4>

Temperature (°C)	Voltage	Deviation (ppm)	Limit (ppm)
50	5	0.0018	± 2.5
40	5	0.0022	± 2.5
30	5	0.0019	± 2.5
20	5	0.0014	± 2.5
10	5	0.0023	± 2.5
0	5	0.0018	± 2.5
-10	5	0.0020	± 2.5
-20	5	0.0018	± 2.5
-30	5	0.0023	± 2.5
20	4.75	0.0021	± 2.5
20	5.25	0.0017	± 2.5

<LTE Band 12>

Temperature (°C)	Voltage	Deviation (ppm)	Limit (ppm)
50	5	0.0035	± 2.5
40	5	0.0026	± 2.5
30	5	0.0032	± 2.5
20	5	0.0021	± 2.5
10	5	0.0028	± 2.5
0	5	0.0029	± 2.5
-10	5	0.0023	± 2.5
-20	5	0.0025	± 2.5
-30	5	0.0023	± 2.5
20	4.75	0.0030	± 2.5
20	5.25	0.0023	± 2.5

<LTE Band 13>

Temperature (°C)	Voltage	Deviation (ppm)	Limit (ppm)
50	5	0.0020	± 2.5
40	5	0.0018	± 2.5
30	5	0.0016	± 2.5
20	5	0.0021	± 2.5
10	5	0.0019	± 2.5
0	5	0.0020	± 2.5
-10	5	0.0020	± 2.5
-20	5	0.0015	± 2.5
-30	5	0.0011	± 2.5
20	4.75	0.0020	± 2.5
20	5.25	0.0020	± 2.5

<LTE Band 66>

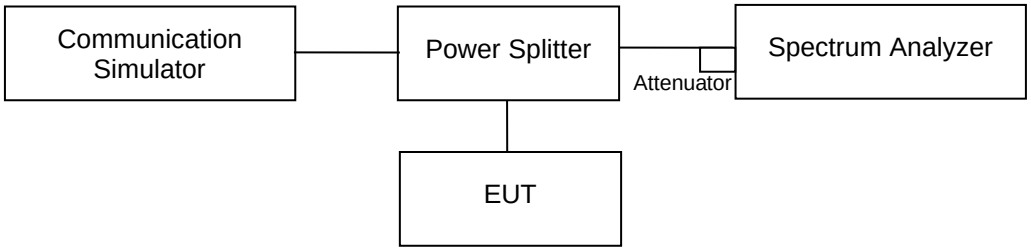
Temperature (°C)	Voltage	Deviation (ppm)	Limit (ppm)
50	5	-0.0018	± 2.5
40	5	-0.0015	± 2.5
30	5	-0.0018	± 2.5
20	5	-0.0013	± 2.5
10	5	-0.0018	± 2.5
0	5	-0.0015	± 2.5
-10	5	-0.0014	± 2.5
-20	5	-0.0016	± 2.5
-30	5	-0.0014	± 2.5
20	4.75	-0.0015	± 2.5
20	5.25	-0.0015	± 2.5

5.1.3 Peak to Average Ratio

Limit 13 dB

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/5/22	2023/6/5
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2023/4/10	2024/4/8	2023/5/22	2023/6/5

Test Procedure

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

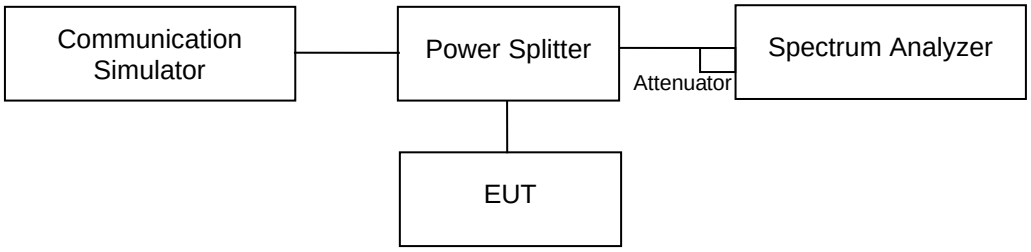
Test Results

Please refer to Appendix A.

5.1.4 Occupied Bandwidth and 26 dB Bandwidth Measurement

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/5/22	2023/6/5
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2023/4/10	2024/4/8	2023/5/22	2023/6/5

Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

- Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Results

Please refer to Appendix A.

5.1.5 Conducted Band Edge & Emission Mask

Limit

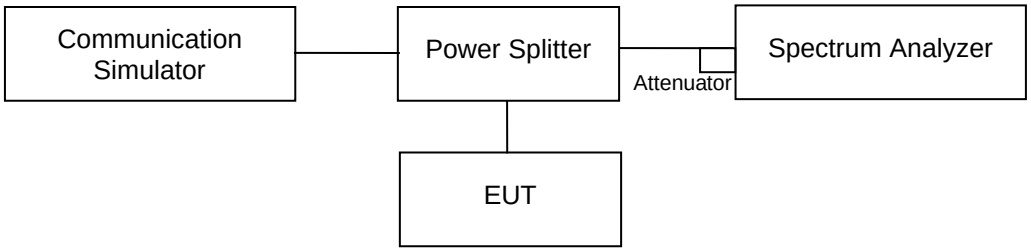
§27.53(h): For operations in the 1710–1755 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

§27.53(g): For operations in the 600 MHz and 698-787 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.
However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

§27.53(c)(2)(4): For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.
On all frequencies between 763-775 MHz and 793-805 MHz, by a factor no less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/5/22	2023/6/5
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2023/4/10	2024/4/8	2023/5/22	2023/6/5

Test Procedure

a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency.
c. Record the maximum trace plot into the test report.

Test Results

Please refer to Appendix A.

5.1.6 Conducted Spurious Emissions

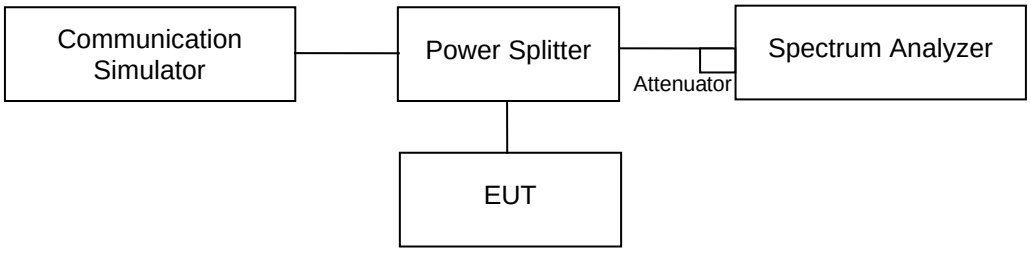
Limit

§27.53(h), §27.53(g): The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB.

§27.53(c)(2)&(f): The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB.
For operations in the 775-788 MHz, 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.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV	101512	2023/2/23	2024/2/22	2023/5/22	2023/6/5
Thermal Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-011	2023/4/10	2024/4/8	2023/5/22	2023/6/5

Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to the 10^{th} harmonic of fundamental frequency. 10 dB attenuation pad is connected with spectrum.

Test Results

Please refer to Appendix A.

5.1.7 Radiated Spurious Emissions

Limit

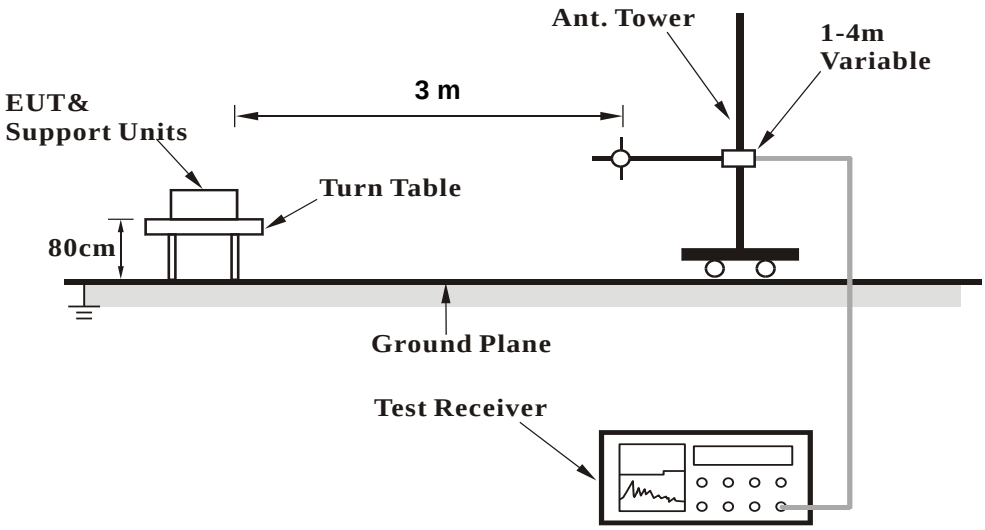
§27.53(h), §27.53(g): The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB.

§27.53(c)(2)&(f): The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB.
For operations in the 775-788 MHz, 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.

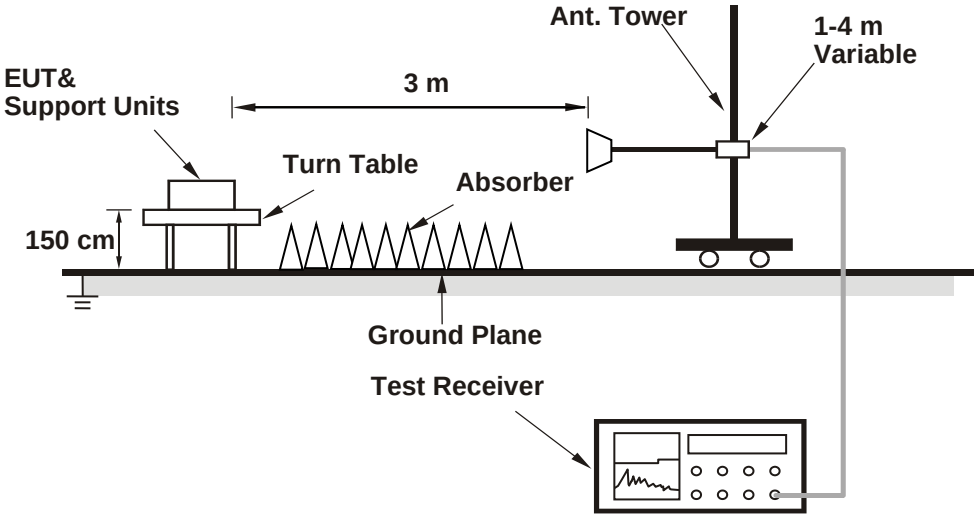
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

<Radiated Emissions below or equal to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz (Test period: 2023-06-06 ~ 2023-06-08)					
Signal Analyzer	R&S	FSV40	101509	2023/4/26	2024/4/24
Radio Communication Analyzer	Anritsu	MT8821C	6262044753	2022/7/7	2023/7/6
Horn Antenna	ETS-Lindgren	3117	00218929	2022/11/17	2023/11/16
HF-AMP + AC source	EMCI	EM01G18GA	980635	2023/2/16	2024/2/15
HF-AMP + AC source	EMCI	EMC184045SE	980656	2023/1/6	2024/1/5
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2023/5/4	2024/5/2
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A
Below 1 GHz (Test period: 2023-08-10 ~ 2023-08-11)					
Receiver	R&S	ESR7	102109	2023/2/24	2024/2/23
Radio Communication Analyzer	Anritsu	MT8821C	6262044753	2023/6/14	2024/6/12
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/29
LF-AMP	Agilent	8447D	2727A05146	2023/2/16	2024/2/15
Test Software	Audix E3	15914a_20191106 tuv	PK-001087	N/A	N/A

Test Procedures

a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7
EIRP (dBm) = E (dB μ V/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
ERP (dBm) = E (dB μ V/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. Testing was carried out within frequency range 30 MHz to the tenth harmonic.
3. All modes of operation were investigated and the worst-case emissions are reported.
4. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

Test Results

Please refer to Appendix B.