

Prüfbericht-Nr.: <i>Test report no.:</i>	CN23MVS1 (P24-WWAN) 001	Auftrags-Nr.: <i>Order no.:</i>	48218163	Seite 1 von 26 Page 1 of 26
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-07-12	
Auftraggeber: <i>Client:</i>	Wistron Corporation 21F., No. 88, Sec. 1, HsinTai 5th Rd., Hsichih Dist, New Taipei City 221, Taiwan			
Prüfgegenstand: <i>Test item:</i>	R5			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	LVR5			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 24 Test report			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 24 Subpart E			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-05-05			
Prüfmuster-Nr.: <i>Test sample no:</i>	A003468922-002 A003468922-009			
Prüfzeitraum: <i>Testing period:</i>	2023-05-22 - 2023-08-11			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>compiled by:</i>			genehmigt von: <i>authorized by:</i>	
Datum: <i>Date:</i>	2023-08-14		Ausstellungsdatum: <i>Issue date:</i>	2023-08-14
Stellung / Position:	David Huang Project Manager		Stellung / Position:	Brenda Chen Senior Project Manager
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* 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				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	2.1046 24.232(c)	Conducted Output Power and Effective Isotropically Radiated Power	Pass
5.1.2	2.1055 24.235	Frequency Stability	Pass
5.1.3	24.232(d)	Peak to Average Ratio	Pass
5.1.4	2.1049	Occupied Bandwidth and 26 dB Bandwidth	Pass
5.1.5	2.1051 24.238(a)	Conducted Band Edge	Pass
5.1.6	2.1051 24.238(a)	Conducted Spurious Emissions	Pass
5.1.7	2.1053 24.238(a)	Radiated Spurious Emissions	Pass

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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APPENDIX A - TEST RESULT OF CONDUCTED

APPENDIX B - TEST RESULT OF RADIATED SPURIOUS EMISSIONS

APPENDIX SP - PHOTOGRAPHS TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

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HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN23MVS1 (P24-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 47CFR Part 2
FCC 47CFR Part 24 Subpart E
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 basis 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 2 (1.4 MHz)	1850.7 ~ 1909.3 MHz
	LTE Band 2 (3 MHz)	1851.5 ~ 1908.5 MHz
	LTE Band 2 (5 MHz)	1852.5 ~ 1907.5 MHz
	LTE Band 2 (10 MHz)	1855.0 ~ 1905.0 MHz
	LTE Band 2 (15 MHz)	1857.5 ~ 1902.5 MHz
	LTE Band 2 (20 MHz)	1860.0 ~ 1900.0 MHz
Modulation	LTE	QPSK, 16QAM
Operation Voltage	4.45 Vdc (Battery) 5 Vdc (Charging Cradle)	
Antenna Information	Coupling Feed antenna with 2.24 dBi gain	
Accessory Device	Refer to 4.3	

Maximum EIRP and Emission Designator

Item	Band	Result
Maximum EIRP (dBm)	LTE Band 2 (1.4 MHz)	24.90
	LTE Band 2 (3 MHz)	24.94
	LTE Band 2 (5 MHz)	24.94
	LTE Band 2 (10 MHz)	24.94
	LTE Band 2 (15 MHz)	24.95
	LTE Band 2 (20 MHz)	25.02
Emission Designator	LTE Band 2 (1.4 MHz)	1M11G7D
	LTE Band 2 (3 MHz)	2M76D7W
	LTE Band 2 (5 MHz)	4M53D7W
	LTE Band 2 (10 MHz)	8M93G7D
	LTE Band 2 (15 MHz)	13M5G7D
	LTE Band 2 (20 MHz)	18M1G7D

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 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 2	1.4 MHz	18607 to 19193	18607, 18900, 19193	QPSK, 16QAM	1 RB
		3 MHz	18615 to 19185	18615, 18900, 19185	QPSK, 16QAM	1 RB
		5 MHz	18625 to 19175	18625, 18900, 19175	QPSK, 16QAM	1 RB
		10 MHz	18650 to 19150	18650, 18900, 19150	QPSK, 16QAM	1 RB
		15 MHz	18675 to 19125	18675, 18900, 19125	QPSK, 16QAM	1 RB
		20 MHz	18700 to 19100	18700, 18900, 19100	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 2	20 MHz	18700 to 19100	18900	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 2	1.4 MHz	18607 to 19193	18607, 18900, 19193	QPSK, 16QAM	1 RB
		3 MHz	18615 to 19185	18615, 18900, 19185	QPSK, 16QAM	1 RB
		5 MHz	18625 to 19175	18625, 18900, 19175	QPSK, 16QAM	1 RB
		10 MHz	18650 to 19150	18650, 18900, 19150	QPSK, 16QAM	1 RB
		15 MHz	18675 to 19125	18675, 18900, 19125	QPSK, 16QAM	1 RB
		20 MHz	18700 to 19100	18700, 18900, 19100	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 2	1.4 MHz	18607 to 19193	18607, 18900, 19193	QPSK, 16QAM	Full RB
		3 MHz	18615 to 19185	18615, 18900, 19185	QPSK, 16QAM	Full RB
		5 MHz	18625 to 19175	18625, 18900, 19175	QPSK, 16QAM	Full RB
		10 MHz	18650 to 19150	18650, 18900, 19150	QPSK	Full RB
		15 MHz	18675 to 19125	18675, 18900, 19125	QPSK	Full RB
		20 MHz	18700 to 19100	18700, 18900, 19100	QPSK	Full RB

Band Edge

- ☒ 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 2	1.4 MHz	18607 to 19193	18607, 19193	QPSK	1 RB / Full RB
		3 MHz	18615 to 19185	18615, 19185	QPSK	1 RB / Full RB
		5 MHz	18625 to 19175	18625, 19175	QPSK	1 RB / Full RB
		10 MHz	18650 to 19150	18650, 19150	QPSK	1 RB / Full RB
		15 MHz	18675 to 19125	18675, 19125	QPSK	1 RB / Full RB
		20 MHz	18700 to 19100	18700, 19100	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 2	1.4 MHz	18607 to 19193	18607, 18900, 19193	QPSK	1 RB
		3 MHz	18615 to 19185	18615, 18900, 19185	QPSK	1 RB
		5 MHz	18625 to 19175	18625, 18900, 19175	QPSK	1 RB
		10 MHz	18650 to 19150	18650, 18900, 19150	QPSK	1 RB
		15 MHz	18675 to 19125	18675, 18900, 19125	QPSK	1 RB
		20 MHz	18700 to 19100	18700, 18900, 19100	QPSK	1 RB

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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 2	20 MHz	18700 to 19100	18700, 18900, 19100	QPSK	1 RB	X-plane

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
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	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

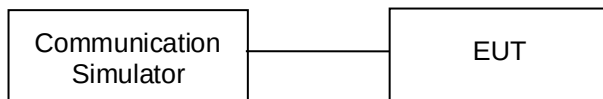
5.1 Transmitter Requirement & Test Suites

5.1.1 Conducted Output Power and EIRP

Limit 2 watt (EIRP)

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.

$EIRP = \text{Conducted Power} + \text{Antenna Gain}$

$ERP = EIRP - 2.15$

Test Result
<Conducted Output Power>

LTE Band 2								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset			
		18607 / 1850.7	18900 / 1880	19193 / 1909.3		18615 / 1851.5	18900 / 1880	19185 / 1908.5
QPSK	1/0	22.46	22.56	22.41	1/0	22.38	22.50	22.35
	1/2	22.50	22.66	22.51	1/7	22.70	22.67	22.57
	1/5	22.47	22.57	22.37	1/14	22.49	22.52	22.57
	3/0	22.32	22.37	22.25	8/0	21.27	21.51	21.27
	3/1	22.30	22.64	22.45	8/3	21.35	21.40	21.27
	3/3	22.31	22.40	22.27	8/7	21.37	21.45	21.29
16QAM	6/0	21.19	21.29	21.19	15/0	21.32	21.38	21.22
	1/0	21.19	21.15	20.96	1/0	21.17	21.18	21.19
	1/2	21.14	21.27	21.11	1/7	21.38	21.30	21.21
	1/5	21.26	21.19	21.18	1/14	21.25	21.25	21.24
	3/0	21.42	21.41	21.10	8/0	20.49	20.64	20.32
	3/1	21.51	21.36	21.43	8/3	20.33	20.66	20.29
16QAM	3/3	21.49	21.36	21.46	8/7	20.49	20.58	20.54
	6/0	20.22	20.19	20.09	15/0	20.29	20.36	20.27
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		18625 / 1852.5	18900 / 1880	19175 / 1907.5		18650 / 1855	18900 / 1880	19150 / 1905
QPSK	1/0	22.20	22.31	22.12	1/0	22.33	22.38	22.22
	1/12	22.23	22.70	22.26	1/24	22.63	22.70	22.51
	1/24	22.21	22.19	22.57	1/49	22.50	22.45	22.31
	12/0	21.04	21.18	20.93	25/0	21.17	21.21	21.08
	12/6	21.06	21.24	21.09	25/12	21.30	21.26	21.18
	12/13	21.16	21.26	21.07	25/25	21.26	21.25	21.10
16QAM	25/0	21.13	21.22	21.05	50/0	21.25	21.26	21.08
	1/0	20.93	21.11	21.00	1/0	21.00	21.22	21.04
	1/12	20.96	21.08	21.00	1/24	21.13	21.24	20.98
	1/24	20.94	21.05	21.05	1/49	21.14	21.11	21.04
	12/0	20.10	20.19	19.98	25/0	20.37	20.39	20.01
	12/6	20.23	20.34	20.20	25/12	20.40	20.34	20.18
16QAM	12/13	20.02	20.16	19.93	25/25	20.38	20.25	20.20
	25/0	20.32	20.31	20.18				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		18675 / 1857.5	18900 / 1880	19125 / 1902.5		18700 / 1860	18900 / 1880	19100 / 1900
QPSK	1/0	22.09	22.12	22.02	1/0	22.60	22.78	22.77
	1/37	22.25	22.71	22.10	1/49	22.70	22.69	22.68
	1/74	22.60	22.24	22.02	1/99	22.35	22.51	22.11
	36/0	21.01	21.08	20.98	50/0	21.33	21.35	21.27
	36/19	21.00	21.11	20.83	50/24	21.29	21.41	21.16
	36/39	21.05	20.97	20.83	50/50	21.28	21.27	21.17
16QAM	75/0	21.02	21.07	20.90	100/0	21.34	21.40	21.27
	1/0	20.82	21.36	20.95	1/0	20.97	21.25	21.21
	1/37	20.99	21.39	20.75	1/49	21.30	21.37	21.23
16QAM	1/74	20.90	20.93	20.84	1/99	21.65	21.23	21.05

<EIRP>

LTE Band 2								
Bandwidth	1.4 MHz				3 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		18607 / 1850.7	18900 / 1880	19193 / 1909.3		18615 / 1851.5	18900 / 1880	19185 / 1908.5
QPSK	1/0	24.70	24.80	24.65	1/0	24.62	24.74	24.59
	1/2	24.74	24.90	24.75	1/7	24.94	24.91	24.81
	1/5	24.71	24.81	24.61	1/14	24.73	24.76	24.81
	3/0	24.56	24.61	24.49	8/0	23.51	23.75	23.51
	3/1	24.54	24.88	24.69	8/3	23.59	23.64	23.51
	3/3	24.55	24.64	24.51	8/7	23.61	23.69	23.53
16QAM	6/0	23.43	23.53	23.43	15/0	23.56	23.62	23.46
	1/0	23.43	23.39	23.20	1/0	23.41	23.42	23.43
	1/2	23.38	23.51	23.35	1/7	23.62	23.54	23.45
	1/5	23.50	23.43	23.42	1/14	23.49	23.49	23.48
	3/0	23.66	23.65	23.34	8/0	22.73	22.88	22.56
	3/1	23.75	23.60	23.67	8/3	22.57	22.90	22.53
	3/3	23.73	23.6	23.70	8/7	22.73	22.82	22.78
	6/0	22.46	22.43	22.33	15/0	22.53	22.60	22.51
Bandwidth	5 MHz				10 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		18625 / 1852.5	18900 / 1880	19175 / 1907.5		18650 / 1855	18900 / 1880	19150 / 1905
QPSK	1/0	24.44	24.55	24.36	1/0	24.57	24.62	24.46
	1/12	24.47	24.94	24.50	1/24	24.87	24.94	24.75
	1/24	24.45	24.43	24.81	1/49	24.74	24.69	24.55
	12/0	23.28	23.42	23.17	25/0	23.41	23.45	23.32
	12/6	23.30	23.48	23.33	25/12	23.54	23.50	23.42
	12/13	23.40	23.50	23.31	25/25	23.50	23.49	23.34
16QAM	25/0	23.37	23.46	23.29	50/0	23.49	23.50	23.32
	1/0	23.17	23.35	23.24	1/0	23.24	23.46	23.28
	1/12	23.20	23.32	23.24	1/24	23.37	23.48	23.22
	1/24	23.18	23.29	23.29	1/49	23.38	23.35	23.28
	12/0	22.34	22.43	22.22	25/0	22.61	22.63	22.25
	12/6	22.47	22.58	22.44	25/12	22.64	22.58	22.42
	12/13	22.26	22.40	22.17	25/25	22.62	22.49	22.44
	25/0	22.56	22.55	22.42				
Bandwidth	15 MHz				20 MHz			
Modulation	RB Size / Offset	Channel / Frequency (MHz)			RB Size / Offset	Channel / Frequency (MHz)		
		18675 / 1857.5	18900 / 1880	19125 / 1902.5		18700 / 1860	18900 / 1880	19100 / 1900
QPSK	1/0	24.33	24.36	24.26	1/0	24.84	25.02	25.01
	1/37	24.49	24.95	24.34	1/49	24.94	24.93	24.92
	1/74	24.84	24.48	24.26	1/99	24.59	24.75	24.35
	36/0	23.25	23.32	23.22	50/0	23.57	23.59	23.51
	36/19	23.24	23.35	23.07	50/24	23.53	23.65	23.40
	36/39	23.29	23.21	23.07	50/50	23.52	23.51	23.41
16QAM	75/0	23.26	23.31	23.14	100/0	23.58	23.64	23.51
	1/0	23.06	23.60	23.19	1/0	23.21	23.49	23.45
	1/37	23.23	23.63	22.99	1/49	23.54	23.61	23.47
	1/74	23.14	23.17	23.08	1/99	23.89	23.47	23.29

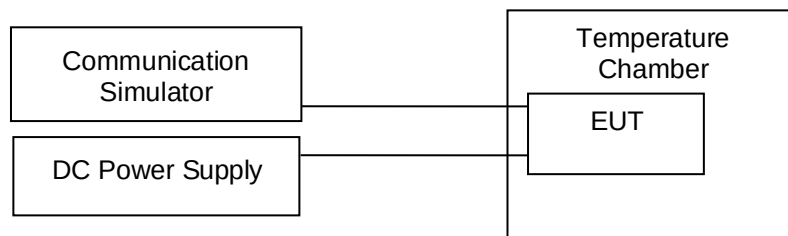
5.1.2 Frequency Stability

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

- 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.
- 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.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5\text{ }^{\circ}\text{C}$ 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.

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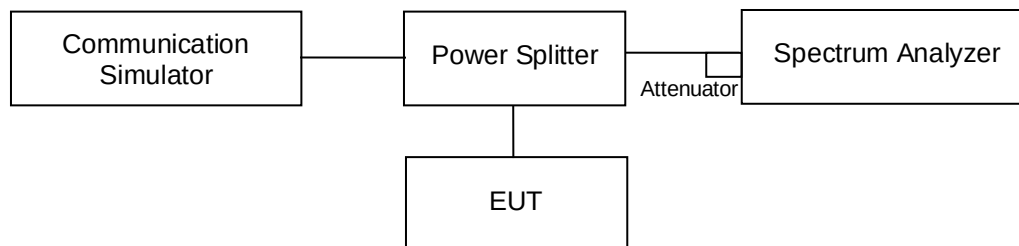
Temperature (°C)	Voltage	Deviation (ppm)	Limit (ppm)
50	5	-0.0017	± 2.5
40	5	-0.0023	± 2.5
30	5	-0.0020	± 2.5
20	5	-0.0019	± 2.5
10	5	-0.0020	± 2.5
0	5	-0.0021	± 2.5
-10	5	-0.0024	± 2.5
-20	5	-0.0019	± 2.5
-30	5	-0.0025	± 2.5
20	4.75	-0.0021	± 2.5
20	5.25	-0.0024	± 2.5

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 $\geq$ 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 %.

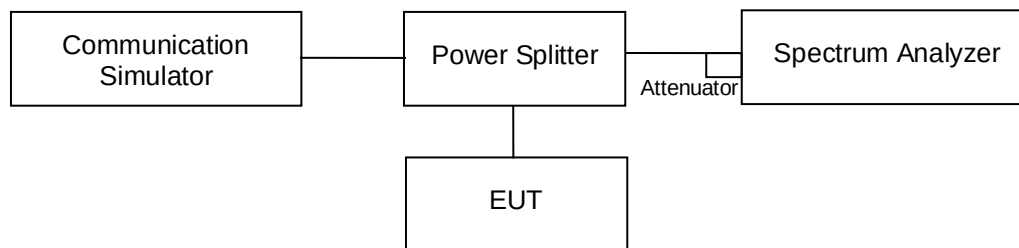
Test Results

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.

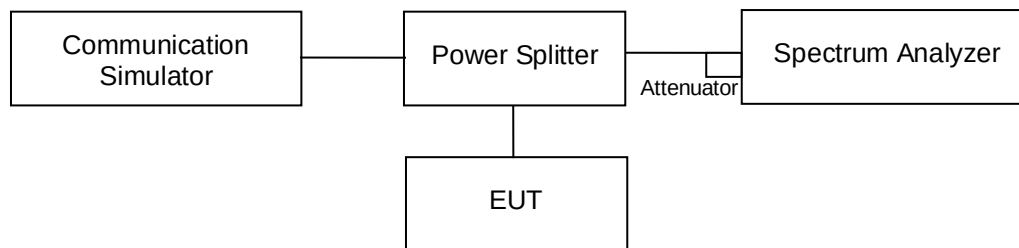
5.1.5 Conducted Band Edge

Limit

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter limit at least $43 + 10 \log(P)$ 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

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

Test Results

Please refer to Appendix A.

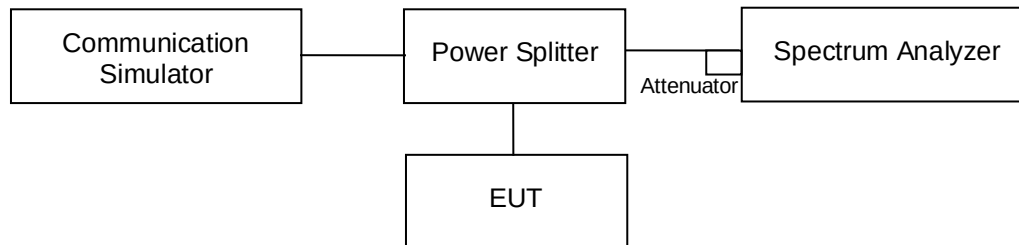
5.1.6 Conducted Spurious Emissions

Limit

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.

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 phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9 KHz to the 10th 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

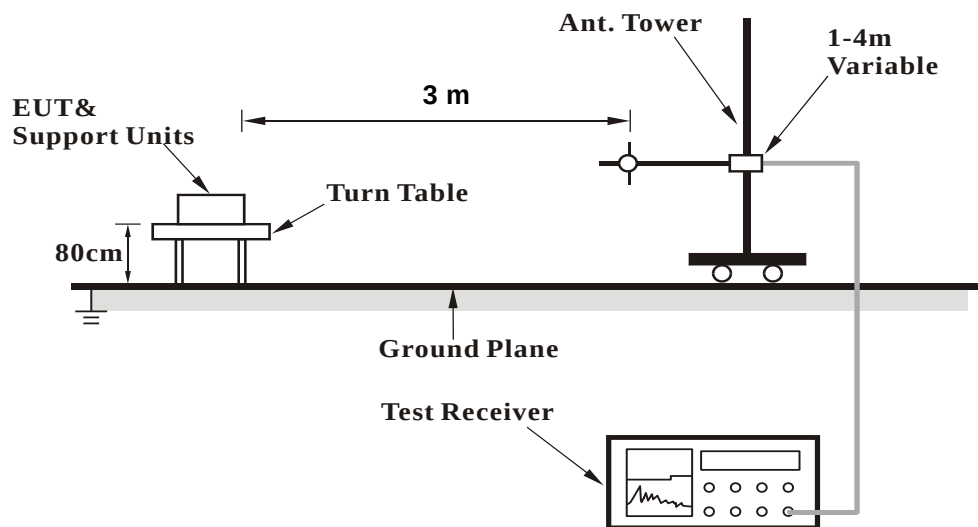
Limit

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.

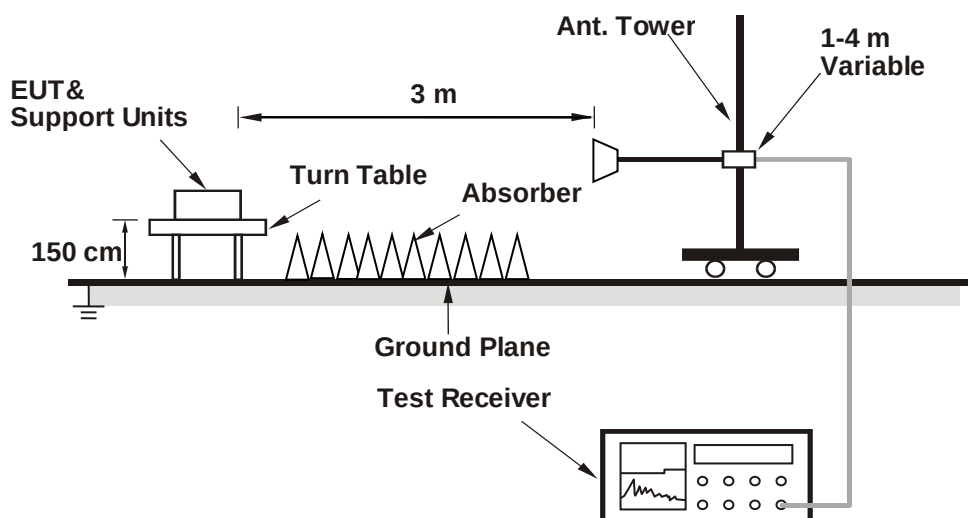
Kind of Test Site 3m Semi-Anechoic Chamber

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).

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Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1 GHz (Test period: 2023-06-07)					
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: 2023-08-11)					
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
$$\text{EIRP (dBm)} = E \text{ (dB } \mu\text{V/m)} + 20\log(D) - 104.8;$$
 where D is the measurement distance (in the far field region) in m.
$$\text{ERP (dBm)} = E \text{ (dB } \mu\text{V/m)} + 20\log(D) - 104.8 - 2.15;$$
 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.