TEST REPORT

KCTL Inc. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR21-SRF0150-A Page (1) of (17)	KCTL

1. Client

- Name : Fibocom Wireless Inc.
- Address : 1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China
- Date of Receipt : 2021-06-03

2. Use of Report : Class II Permissive change

3. Name of Product / Model : Notebook PC / XE345XDA

4. Series Model : XE345XDA-LA1VZ

5. Manufacturer / Country of Origin : Fibocom Wireless Inc. / China

6. FCC ID : ZMOL850GLD

7. Date of Test : 2021-06-25 to 2021-06-28

8. Location of Test : ■ Permanent Testing Lab ☐ On Site Testing
(Address:65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)

9. Test method used : FCC Part 2
FCC Part 22 subpart H
FCC Part 24 subpart E
FCC Part 27 subpart C

10. Test Result : Refer to the test result in the test report

	Tested by	Technical Manager
Affirmation	Name : Kwonse Kim (Signature)	Name : Seungyong Kim (Signature)

2021-07-13

KCTL Inc.

REPORT REVISION HISTORY

Date	Revision	Page No
2021-07-06	Originally issued	-
2021-07-13	Modified hardware version	4

Note. The report No. KR21-SRF0150 is superseded by the report No. KR21-SRF0150-A.

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

CONTENTS

1. General information

Client	:	Fibocom Wireless Inc.
Address	:	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China
Manufacturer	:	Fibocom Wireless Inc.
Address	:	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132
		VCCI Registration No. : R-20080, G-20078, C-20059, T-20056
		CAB Identifier: KR0040
		ISED Number: 8035A
		KOLAS No.: KT231

2. Device information

Equipment under test	:	Notebook PC
Model	:	XE345XDA
Series Model	:	XE345XDA-LA1VZ
Integrated WWAN Module	:	Fibocom
		L850-GL
		ZMOL850GLD
Modulation technique	:	LTE_QPSK, 16QAM
		WCDMA_QPSK
Power source	:	DC 7.72 V
Antenna specification	:	LTE_FPCB Antenna
Frequency range	:	LTE Band 2_1 850 ㎒ ~ 1 910 ㎒
		LTE Band 4_1 710 ㎒ ~ 1 755 ㎒
		LTE Band 5_824 ㎒ ~ 849 ㎒
		LTE Band 13_777 ㎒ ~ 787 ㎒
Software version	:	Chrome OS
Hardware version	:	REV5
Test device serial No.	:	4W619FAR500023N
Operation temperature	:	10 ℃ ~ 35 ℃

Note.
1. In this report is based on original report FCC ID: ZMOL850GLD, additional simultaneous transmission measurement with intel module AX201D2W which is also integrated into this host was investigated in test report.
2. Series model: the SKU model name is a 5-digit identification number that is added after the basic model name (8 digits), and serves as a memo to indicate detailed specifications/businesses.

2.1. Additional WLAN/Bluetooth Module information

Manufacturer	:	Intel Mobile Communications	
Model	:	AX201D2W	
FCC ID		PD9AX201D2	
Modulation technique	:	DSSS, OFDM, OFDMA	
Frequency range	:	802.11b/g/n/ax	2.4 GHz Band (2 400.0 – 2 483.5 MHz)
		802.11a/n/ac/ax	5.15 GHz Band (5 150.0 – 5 250.0 MHz)
			5.25 GHz Band (5 250.0 – 5 350.0 MHz)
			5.47 GHz Band (5 470.0 – 5 725.0 MHz)
			5.725 GHz Band (5 725.0 – 5 850.0 MHz)
		Bluetooth/Low Energy	2.4 GHz Band (2 400.0 – 2 483.5 MHz)
Antenna Information	:	Chain A (Aux): WLAN 2.4 GHz & 5 GHz and Bluetooth	
		Chain B (Main): WLAN 2.4 GHz & 5 GHz	

2.2. Simultaneous Transmission Configurations

No	Scenario
1	Bluetooth (Aux) + WWAN

Note.
- WWAN does not work simultaneously with WIFI.
- For the simultaneous mode the lowest margin condition among the channels and modes of each module (Cellular module L850-GL, Unlicensed module AX201D2W) was selected for the test.

2.3. Frequency/channel operations

This device contains the following capabilities: LTE Band 2, LTE Band 4, LTE Band 5, LTE Band 13

LTE Band 2

Ch.	Frequency (㎒)
18607	1 850.7
18900	1 880.0
19193	1 909.3

Table 2.3.1. 1.4M BW

Ch.	Frequency (㎒)
18615	1 851.5
18900	1 880.0
19185	1 908.5

Table 2.3.2. 3M BW

Ch.	Frequency (㎒)
18625	1 852.5
18900	1 880.0
19175	1 907.5

Table 2.3.3. 5M BW

Ch.	Frequency (㎒)
18650	1 855.0
18900	1 880.0
19150	1 905.0

Table 2.3.4. 10M BW

Ch.	Frequency (㎒)
18675	1 857.5
18900	1 880.0
19125	1 902.5

Table 2.3.5. 15M BW

Ch.	Frequency (㎒)
18700	1 860.0
18900	1 880.0
19100	1 900.0

Table 2.3.6. 20M BW

LTE Band 4

Ch.	Frequency (㎒)
19957	1 710.7
20175	1 732.5
20393	1 754.3

Table 2.3.7. 1.4M BW

Ch.	Frequency (㎒)
19965	1 711.5
20175	1 732.5
20385	1 753.5

Table 2.3.8. 3M BW

Ch.	Frequency (㎒)
19975	1 712.5
20175	1 732.5
20375	1 752.5

Table 2.3.9. 5M BW

Ch.	Frequency (㎒)
20000	1 715.0
20175	1 732.5
20350	1 750.0

Table 2.3.10. 10M BW

Ch.	Frequency (㎒)
20025	1 717.5
20175	1 732.5
20325	1 747.5

Table 2.3.11. 15M BW

Ch.	Frequency (㎒)
20050	1 720.0
20175	1 732.5
20300	1 745.0

Table 2.3.12. 20M BW

LTE Band 5

Ch.	Frequency (㎒)
20407	824.7
20525	836.5
20643	848.3

Table 2.3.13. 1.4M BW

Ch.	Frequency (㎒)
20415	825.5
20525	836.5
20635	847.5

Table 2.3.14. 3M BW

Ch.	Frequency (㎒)
20425	826.5
20525	836.5
20625	846.5

Table 2.3.15. 5M BW

Ch.	Frequency (㎒)
20450	829.0
20525	836.5
20600	844.0

Table 2.3.16. 10M BW

LTE Band 13

Ch.	Frequency (㎒)
23205	779.5
23230	782.0
23255	784.5

Table 2.3.17. 5M BW

Ch.	Frequency (㎒)
-	-
23230	782.0
-	-

Table 2.3.18. 10M BW

3. Summary of tests

FCC Part section(s)	Parameter	Test Limit	Test Condition	Test results
22.913(a)(5)	Effective Radiated Power	< 7 Watts max. ERP	Radiated	Pass
27.50(b)(10)		< 3 Watts max. ERP		Pass
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		Pass
27.50(d)(4)		< 1 Watts max. EIRP		Pass
2.1053 22.917(a) 24.238(a) 27.53(f),(h)	Radiated Spurious Emissions	< 43 + 10Log$_{10}$(P) dB for all out of band emissions, <-70 dBW/㎒ EIRP – Wideband <-80 dBW/㎒ EIRP - Narrowband		Pass

Notes:

1. The test procedure(s) in this report were performed in accordance as following.
   - ANSI C63.26-2015
   - ANSI/TIA-603-E-2016
   - KDB 971168 D01 v03r01
2. This is the C2PC test report to add host (Notebook PC), XE345XDA as documented in the C2PC letter. Because the change does not affect RF characteristics, therefore, only radiated spurious emission test was done against the worst case from the original module.

4. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014.

All measurement uncertainty values are shown with a coverage factor of k=2 to indicated a 95 % level of confidence. The measurement data shown herein meets of exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine compliance.

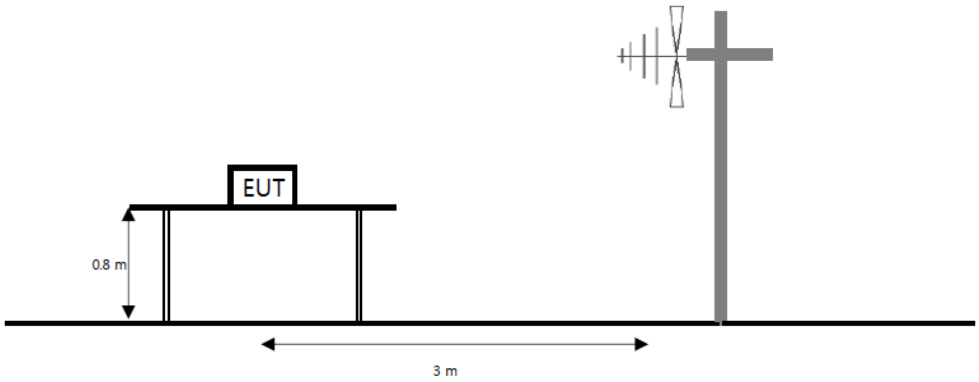
Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	Below 1 000 ㎒	4.3 dB
	1 000 ㎒ ~ 18 000 ㎒	3.8 dB
	Above 18 000 ㎒	3.8 dB

5. Test results

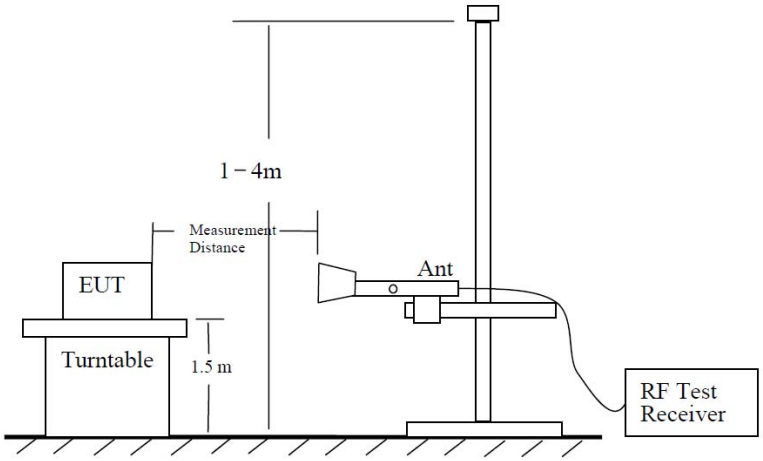
5.1. Radiated Power (ERP/EIRP)

Test setup

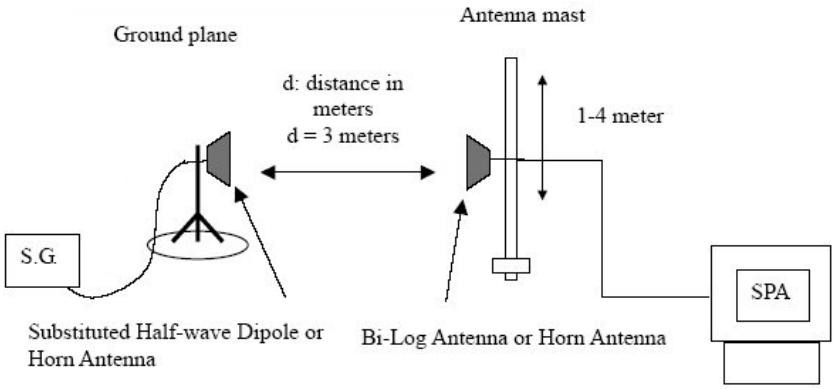
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §22.913(a)(5), the ERP of transmitters in the cellular radiotelephone service must not exceed the limits in this section. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to §24.232(c), Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to §27.50(b)(10), Portable stations (hand-held devices) transmitting in the 746-757 ㎒, 776-788 ㎒, and 805-806 ㎒ bands and limited to 3 watts ERP.

According to §27.50(d)(4), Fixed, mobile and portable (hand-held) stations operating in the 1710-1755 ㎒ band and mobile and portable stations operating in the 1695-1710 ㎒ and 1755-1780 ㎒ bands are limited to 1 watt EIRP.

Test procedure

971168 D01 v03r01 - Section 5.2 and 5.8, 412172 D01 v01r01
ANSI 63.26-2015 – Section 5.2
ANSI/TIA-603-E-2016 - Section 2.2.17

Test settings

1) RBW = 1 % to 5 % of the OBW.
2) VBW ≥ 3 × RBW.
3) SPAN = 2 × to 3 × the OBW.
4) Number of measurement points in sweep ≥ 2 × span / RBW.
5) Sweep time :
   1) Auto couple, or
   2) ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6) Detector = RMS
7) If the EUT can be configured to transmit continuously, then set the trigger to free run.
8) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full -power transmissions).
9) Trace mode = trace averaging (RMS) over 100 sweeps.
10) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11) Allow trace to fully stabilize.

Notes:

1. On a test site, the EUT shall be placed at 80 cm or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to Correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the Level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
   The power is calculated by the following formula;
   Pd(㏈m) = Pg(㏈m) – Cable loss (㏈) + Antenna gain (㏈)
   Note. Pd is the dipole equivalent power and Pg is the generator output power into the substitution antenna.
7. The test antenna shall be raised and lowered through the specified range of height to ensure that The maximum signal is received.
8. The input signal to the substitution antenna shall be adjusted to the level that produces a level Detected by the measuring corrected for the change of input attenuator setting of the measuring Receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for Any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna Orientated for horizontal polarization.

Test results

Test mode: LTE Band 2

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
20 M	QPSK	1 860.0	H	5.44	7.89	22.72	20.27	0.106

Test mode: LTE Band 4

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
20 M	QPSK	1 720.0	H	5.77	7.58	24.22	22.41	0.174

Test mode: LTE Band 5

Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
10 M	QPSK	844.0	H	-2.87	5.33	26.09	17.89	0.062

Test mode: LTE Band 13

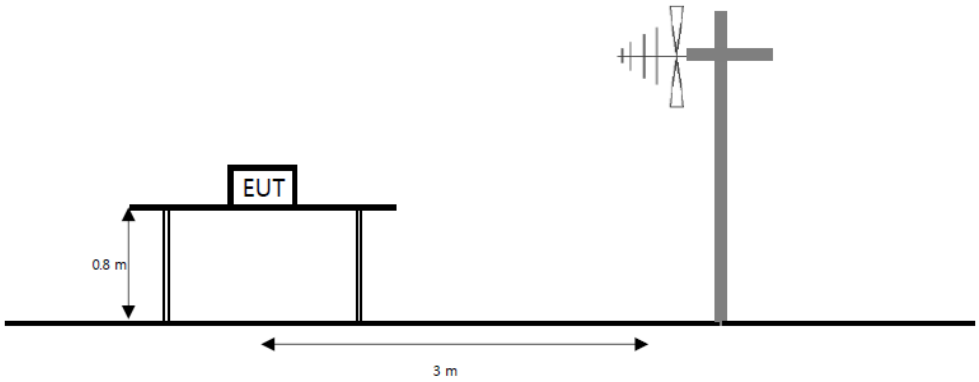
Bandwidth	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
10 M	QPSK	782.0	H	-1.65	5.08	24.62	17.89	0.062

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈d & ㏈i) - C.L(Cable loss) (㏈)

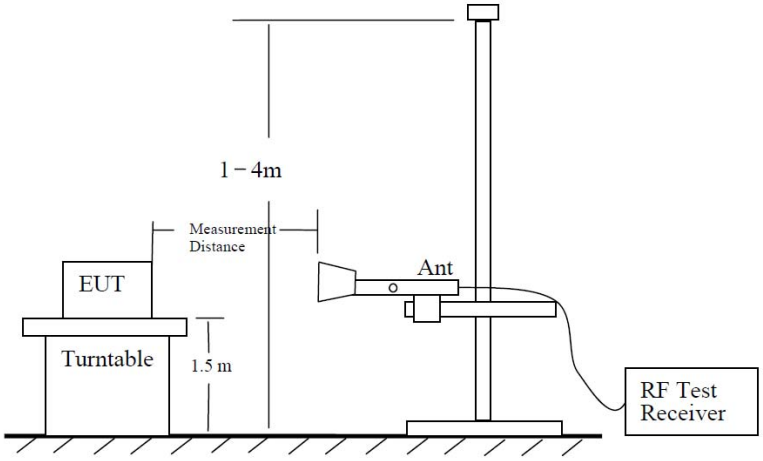
5.2. Radiated Spurious Emissions

Test setup

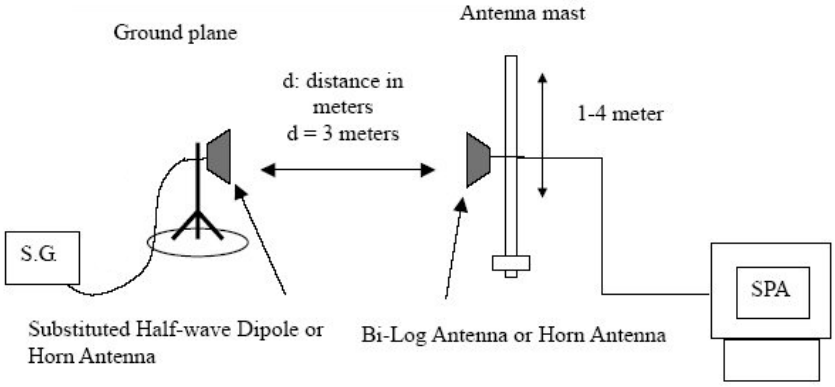
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §22.917(a), §24.238(a), 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 + 10log($P_{[Watts]}$) ㏈.

According to §27.53(f), for operations in the 746-758 ㎒, 775-788 ㎒ and 805-806 ㎒ bands, emissions in the band 1559-1610 ㎒ shall be limited to -70 ㏈W/㎒ equivalent isotropically radiated power (EIRP) for wideband signals, -80 ㏈W EIRP for discrete emissions of less than 700 ㎐ bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with and antenna that is representative of the type that will be used with the equipment in normal operation.

According to §27.53(h), the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10log($P_{[Watts]}$) ㏈.

Test procedure

971168 D01 v03r01 - Section 6.2
ANSI 63.26-2015 – Section 5.5
ANSI/TIA-603-E-2016 - Section 2.2.12

Test settings

1) RBW = 100 ㎑ for below 1 ㎓ and 1 ㎒ for above 1 ㎓.
2) VBW ≥ 3 × RBW.
3) Detector = RMS
4) Trace mode = Max hold
5) Sweep time = Auto couple
6) Number of sweep points ≥ 2 × span / RBW
7) Allow trace to fully stabilize.

For the narrowband spurious settings:

1) RBW = 1 ㎑
2) VBW = 3 ㎑
3) Detector = RMS
4) Trace mode = Max hold
5) Sweep speed slow enough to maintain measurement calibration.

Notes:

1. On a test site, the EUT shall be placed at 80 cm or 1.5 m height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
7. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
8. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring corrected for the change of input attenuator setting of the measuring receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

Test results (Above 1 000 ㎒)

Test mode : LTE Band 2
Frequency(㎒) : 1 900.0
Channel : 19100
Bandwidth(㎒) : 20

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 783.12	V	8.64	11.33	-50.41	-53.10	-13.00	40.10
	5 676.29	H	10.54	14.02	-49.32	-52.80	-13.00	39.80
	7 563.31	V	12.15	16.25	-44.90	-49.00	-13.00	36.00
	9 461.87	H	13.20	18.17	-40.83	-45.80	-13.00	32.80

Test mode : LTE Band 4
Frequency(㎒) : 1 745.0
Channel : 20300
Bandwidth(㎒) : 20

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 471.56	H	8.22	10.83	-47.89	-50.50	-13.00	37.50
	5 212.42	V	10.27	13.44	-47.33	-50.50	-13.00	37.50
	6 944.05	H	11.33	15.45	-36.38	-40.50	-13.00	27.50
	10 416.53	H	13.10	19.05	-30.65	-36.60	-13.00	23.60

Test mode : LTE Band 5
Frequency(㎒) : 836.5
Channel : 20525
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 664.24	V	5.91	7.43	-50.38	-51.90	-13.00	38.90
	2 496.28	H	6.19	9.04	-49.75	-52.60	-13.00	39.60
	3 326.27	V	7.81	10.58	-50.83	-53.60	-13.00	40.60
	4 157.91	V	8.81	11.78	-50.13	-53.10	-13.00	40.10

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈i&㏈d) - C.L(Cable loss) (㏈)

Test mode : LTE Band 13
Frequency(㎒) : 782.0
Channel : 23230
Bandwidth(㎒) : 10

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 554.70	H	6.17	7.19	-57.48	-58.50	-13.00	45.50
	2 330.12	H	5.83	8.67	-51.46	-54.30	-13.00	41.30
	3 106.78	V	7.20	10.20	-49.80	-52.80	-13.00	39.80
	3 887.53	V	8.77	11.50	-49.87	-52.60	-13.00	39.60

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈i&㏈d) - C.L(Cable loss) (㏈)

Spurious Emission for Simultaneous Condition

Case	WWAN	Bluetooth
Mode	LTE Band 4	EDR (2DH5)
Channel	20300	39
Frequency(㎒)	1745	2441
Bandwidth(㎒)	20	-

Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
6 944.69	H	11.33	15.45	-37.18	-41.30	-13.00	28.30
10 417.28	H	13.10	19.05	-33.25	-39.20	-13.00	26.20

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈i&㏈d) - C.L(Cable loss) (㏈)
2. For the simultaneous mode the lowest margin condition among the channels and modes were selected for the test.

6. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	KEYSIGHT	N9040B	MY57010132	21.07.29
Vector Signal Generator	R&S	SMBV100A	257566	22.07.09
Signal Generator	R&S	SMB100A	176206	22.01.20
Widebnad Radio Communication Tester	R&S	CMW500	141780	22.04.01
Amplifier	L-3 Narda-MITEQ	AFS5-00101800-25-S-5	2054570	21.08.28
Broadband Amplifier	SONOMA INSTRUMENT	310N	186280	22.04.01
Biconical VHF-UHF Broadband Antenna	SCHWARZBECK	VUBA9117	275	22.04.09
Bilog Antenna	ETS.LINDGREN	3143B	00228420	21.09.30
Horn Antenna	ETS.lindgren	3117	161225	22.05.11
Horn Antenna	ETS.LINDGREN	3117	00227509	21.09.23
High pass Filter	Wainwright Instruments GmbH	WHKX8-5655-6500-18000-40SS	5	21.08.20
High pass Filter	Wainwright Instruments GmbH	WHKX3.0/18G-12SS	44	22.01.20
High pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	21.08.20
Band Reject Filter	Wainwright Instruments GmbH	WRCTF2402/2480-2400/2483.5-35/12+9SS	43	22.01.20
Band Reject Filter	Wainwright Instruments GmbH	WRCD1735/1760-1733/1762-40/20SS	3	22.05.11
Band Reject Filter	Wainwright Instruments GmbH	WTRCJV8-5100-5850-20-100-50SSK	62	21.10.13
Antenna Mast	MATURO	EAS 1.5	042/8941211	N/A
Antenna Mast	MATURO	EAS 1.5	043/8941211	N/A
Turn Table	MATURO	TT 0.8 PF	041/8941211	N/A
Cable Assembly	Radiall	R286303620	1649.241	
Cable Assembly	Radiall	TESTPRO 3	N/A	

End of test report