TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-5008-1021 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR23-SRF0170-A Page (1) of (20)	eurofins | KCTL

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2023-03-14

2. Use of Report : Class II Permissive change

3. Name of Product / Model : 5G sub-6 GHz M.2 Module with WCDMA and LTE / RM520N-GL

4. Manufacturer / Country of Origin : Samsung Electronics Co., Ltd. / Vietnam

5. Host Name of Product / Model : Notebook PC / NP935QNA

6. FCC ID : A3LRM520N935QNA

7. Date of Test : 2023-04-15 to 2023-05-24

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 : Sunghyun Yoon (Signature)	Name : Seungyong Kim (Signature)

2023-06-01

Eurofins KCTL Co.,Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2023-05-26	Originally issued	-
2023-06-01	Updated	4,12

Note. The report No. KR23-SRF0170 is superseded by the report No. KR23-SRF0170-A.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	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Factory	:	SAMSUNG ELECTRONICS VIETNAM CO.,LTD.
Address	:	Khu Cong nghiep Ten Phong 1, Yen Trung, Yen Phong, Bac Ninh, Vietnam
Laboratory	:	Eurofins KCTL Co.,Ltd.
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	:	5G sub-6 GHz M.2 Module with WCDMA and LTE		
Model	:	RM520N-GL		
Host name of Product	:	Notebook PC		
Host Model	:	NP935QNA		
Modulation technique	:	DFT-s OFDM	:	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM
		CP-OFDM	:	QPSK, 16QAM, 64QAM, 256QAM
Power source	:	DC 11.58 V		
Antenna specification	:	Antenna 0	:	PIFA Antenna (5G NR N2/5/66)
		Antenna 2	:	PIFA Antenna (5G NR N2/66/77)
EN-DC for NSA	:	4A-n2A (4A: Antenna 2 LTE B4, n2A: Antenna 0 NR N2)		
		66A-n2A (66A: Antenna 2 LTE B66, n2A: Antenna 0 NR N2)		
		2A-n5A (2A: Antenna 2 LTE B2, n5A: Antenna 0 NR N5)		
		66A-n5A (66A: Antenna 2 LTE B66, n5A: Antenna 0 NR N5)		
		2A-n66A (2A: Antenna 2 LTE B2, n66A: Antenna 0 NR N66)		
		5A-n2A (5A: Antenna 0 LTE B5, n2A: Antenna 2 NR N2)		
		12A-n2A (12A: Antenna 0 LTE B12, n2A: Antenna 2 NR N2)		
		14A-n2A (14A: Antenna 0 LTE B14, n2A: Antenna 2 NR N2)		
		5A-n66A (5A: Antenna 0 LTE B5, n66A: Antenna 2 NR N66)		
		12A-n66A (12A: Antenna 0 LTE B12, n66A: Antenna 2 NR N66)		
		14A-n66A (14A: Antenna 0 LTE B14, n66A: Antenna 2 NR N66)		
		2A-n77A (2A: Antenna 0 LTE B2, n77A: Antenna 2 NR N77)		
		5A-n77A (5A: Antenna 0 LTE B5, n77A: Antenna 2 NR N77)		
		12A-n77A (12A: Antenna 0 LTE B12, n77A: Antenna 2 NR N77)		
		14A-n77A (14A: Antenna 0 LTE B14, n77A: Antenna 2 NR N77)		
		66A-n77A (66A: Antenna 0 LTE B66, n77A: Antenna 2 NR N77)		

Frequency range	:	N2	:	1 852.5 ㎒ ~ 1907.5 ㎒
		N5	:	826.5 ㎒ ~ 846.5 ㎒
		N66	:	1 712.5 ㎒ ~ 1 777.5 ㎒
		N77	:	3 460.02 ㎒ ~ 3 540.0 ㎒
			:	3 710.01 ㎒ ~ 3 969.99 ㎒
Bandwidth	:	N2	:	5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
		N5	:	5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒
		N66	:	5 ㎒, 10 ㎒, 15 ㎒, 20 ㎒, 30 ㎒
		N77	:	20 ㎒, 30 ㎒, 40 ㎒, 60 ㎒, 80 ㎒, 100 ㎒
SCS	:	N2/5/66	:	15 ㎑
		N77	:	30 ㎑
Software version	:	NP930QNA.001		
Hardware version	:	REV0.1		
Test device serial No.	:	Radiated	:	KQZZ930W300232D, KQZZ930W300219W
Operation temperature	:	10 ℃ ~ 35 ℃		

Note.
In this report is based on original report FCC ID: A3LRM520N935QNA, additional simultaneous transmission measurement with the host notebook PC (FCC ID: A3LNP935QNA) was investigated in test report.

2.1. Frequency/channel operations

This device contains the following capabilities:
WCDMA 850/1700/1900, LTE B2/4/5/12/14/66, NR n2/5/66/77

NR Band N2

Ch.	Frequency (㎒)
370500	1 852.5
376000	1 880.0
381500	1 907.5

Table 2.1.1. 5M BW

Ch.	Frequency (㎒)
371000	1 855.0
376000	1 880.0
381000	1 905.0

Table 2.1.2. 10M BW

Ch.	Frequency (㎒)
371500	1 857.5
376000	1 880.0
380500	1 902.5

Table 2.1.3. 15M BW

Ch.	Frequency (㎒)
372000	1 860.0
376000	1 880.0
380000	1 900.0

Table 2.1.4. 20M BW

NR Band N5

Ch.	Frequency (㎒)
165300	826.5
167300	836.5
169300	846.5

Table 2.1.5. 5M BW

Ch.	Frequency (㎒)
165800	829.0
167300	836.5
168800	844.0

Table 2.1.6. 10M BW

Ch.	Frequency (㎒)
166300	831.5
167300	836.5
168300	841.5

Table 2.1.7. 15M BW

Ch.	Frequency (㎒)
166800	834.0
167300	836.5
167800	839.0

Table 2.1.8. 20M BW

NR Band 66

Ch.	Frequency (㎒)
342500	1 712.5
349000	1 745.0
355500	1 777.5

Table 2.1.9. 5M BW

Ch.	Frequency (㎒)
343000	1 715.0
349000	1 745.0
355000	1 775.0

Table 2.1.10. 10M BW

Ch.	Frequency (㎒)
343500	1 717.5
349000	1 745.0
354500	1 772.5

Table 2.1.11. 15M BW

Ch.	Frequency (㎒)
344000	1 720.0
349000	1 745.0
354000	1 770.0

Table 2.1.12. 20M BW

Ch.	Frequency (㎒)
345000	1 725.0
349000	1 745.0
353000	1 765.0

Table 2.1.13. 30M BW

NR Band 77 (3 450 ㎒ ~ 3 550 ㎒)

Ch.	Frequency (㎒)
630668	3460.02
633334	3500.01
636000	3540.00

Table 2.1.14. 20M BW

Ch.	Frequency (㎒)
631000	3465.00
633334	3500.01
635666	3534.99

Table 2.1.15. 30M BW

Ch.	Frequency (㎒)
631334	3470.01
633334	3500.01
635332	3529.98

Table 2.1.16. 40M BW

Ch.	Frequency (㎒)
632000	3480.00
633334	3500.01
634666	3519.99

Table 2.1.17. 60M BW

Ch.	Frequency (㎒)
632668	3490.02
633334	3500.01
634000	3510.00

Table 2.1.18. 80M BW

Ch.	Frequency (㎒)
633334	3500.01

Table 2.1.19. 100M BW

NR Band 77 (3 700 ㎒ ~ 3 980 ㎒)

Ch.	Frequency (㎒)
647334	3710.01
656000	3840.00
664666	3969.99

Table 2.1.20. 20M BW

Ch.	Frequency (㎒)
647668	3715.02
656000	3840.00
664332	3964.98

Table 2.1.21. 30M BW

Ch.	Frequency (㎒)
648000	3720.00
656000	3840.00
664000	3960.00

Table 2.1.22. 40M BW

Ch.	Frequency (㎒)
648668	3730.02
656000	3840.00
663332	3949.98

Table 2.1.23. 60M BW

Ch.	Frequency (㎒)
649334	3740.01
656000	3840.00
662666	3939.99

Table 2.1.24. 80M BW

Ch.	Frequency (㎒)
650000	3750.00
656000	3840.00
662000	3930.00

Table 2.1.25. 100M 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
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		Pass
27.50(d)(4) 27.50(j)(3), 27.50(k)(3)		< 1 Watts max. EIRP		Pass
2.1053 22.917(a) 24.238(a) 27.53(h) 27.53(l)(2) 27.53(n)(2)	Radiated Spurious Emissions	< 43 + 10Log$_{10}$(P) dB for all out of band emissions, < -13 dBm for all out of band emissions,		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), NP935QNA 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 highest output power.
3. This device only support NSA mode. All test was performed in a combination with the highest output of LTE anchors among several EN-DC combinations.
4. All the radiated tests have been performed two modes (notebook and tablet mode) and the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z.
   Worst case: Notebook mode, X axis
5. All the radiated tests have been performed several case. (Stand-alone, with accessories (TA))
   Worst case: stand-alone

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.

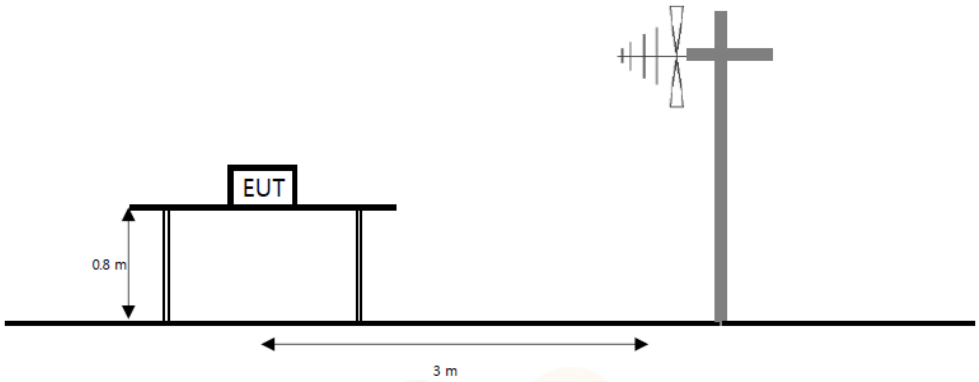
Parameter	Expanded uncertainty (±)	
Radiated spurious emissions	Below 1 000 ㎒	2.5 dB
	1 000 ㎒ ~ 18 000 ㎒	4.7 dB
	Above 18 000 ㎒	4.8 dB

5. Test results

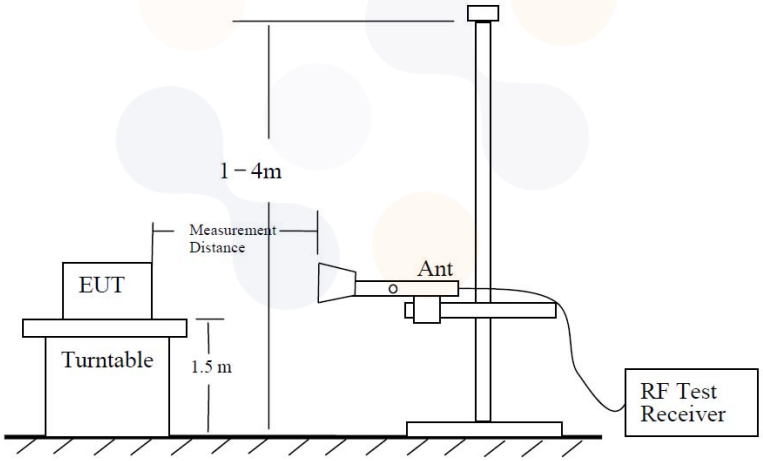
5.1. Radiated Power (ERP/EIRP)

Test setup

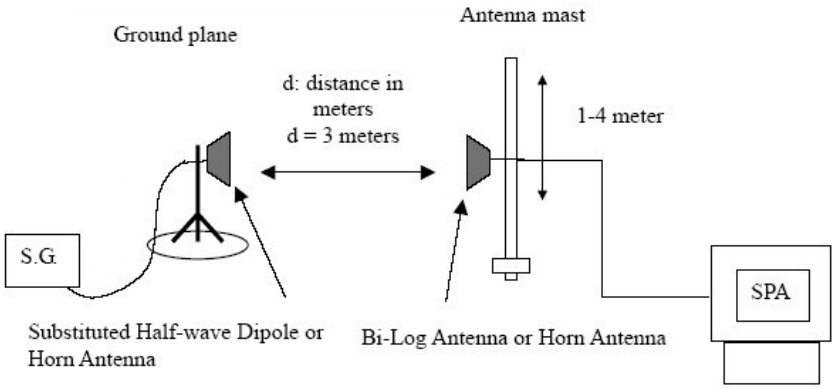
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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(d)(4), 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.

According to §27.50(j)(3), Mobile and portable stations are limited to 1 watt EIRP.

According to §27.50(k)(3), Mobile devices are limited to 1 watt (30 ㏈m) 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: NR N2 (Antenna 0)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
20 M	DFT-s OFDM	15	QPSK	1 880.0	H	5.54	5.19	20.27	20.62	0.115

Test mode: NR N2 (Antenna 2)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
15 M	DFT-s OFDM	15	QPSK	1 880.0	H	5.54	5.19	20.10	20.45	0.111

Test mode: NR N5 (Antenna 0)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
				[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[W]
15 M	DFT-s OFDM	15	QPSK	836.5	H	5.40	2.58	21.91	24.73	0.297

Test mode: NR N66 (Antenna 0)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
10 M	DFT-s OFDM	15	QPSK	1 745.0	H	5.81	5.21	23.06	23.66	0.232

Test mode: NR N66 (Antenna 2)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
15 M	DFT-s OFDM	15	QPSK	1 745.0	H	5.81	5.21	16.44	17.04	0.051

Test mode: NR N77_Lower Band (Antenna 2)

Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
30 M	DFT-s OFDM	30	16QAM	3 465.0	H	8.19	6.91	21.75	23.03	0.201

Test mode: NR N77_Upper Band (Antenna 2)

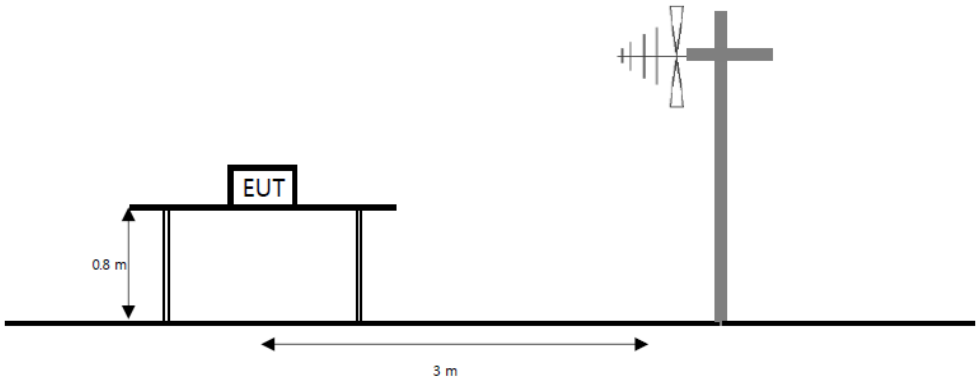
Bandwidth	Waveform	SCS (㎑)	Modulation	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
				[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[W]
40 M	DFT-s OFDM	30	16QAM	3 840.0	H	8.71	7.04	21.25	22.92	0.196

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

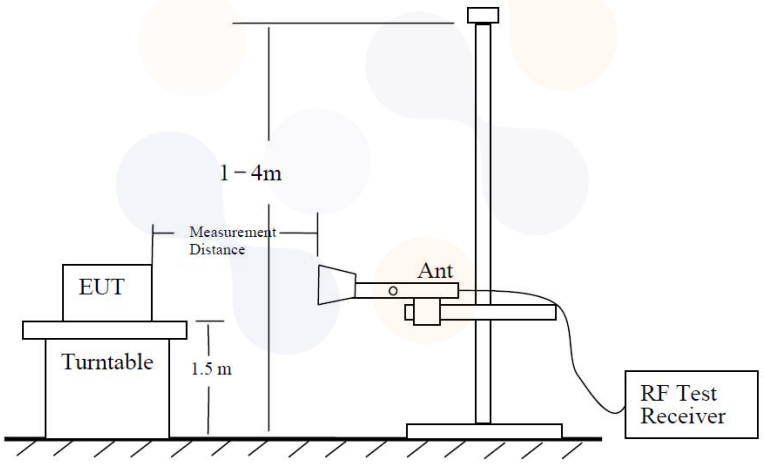
5.2. Radiated Spurious Emissions

Test setup

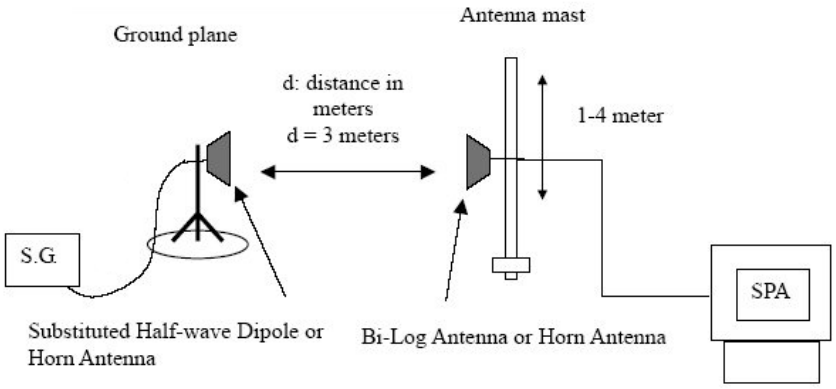
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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(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($P_{[Watts]}$) ㏈.

According to §27.53(l)(2), 27.53(n)(2) power of any emission outside the licensee's authorized bandwidth shall not exceed −13 ㏈m/㎒.

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.

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

Test mode : 4A-n2A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 880.0
Channel : 376000
Bandwidth(㎒) : 5 (LTE), 20 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 759.75	H	8.61	6.96	-47.95	-46.30	-13.00	33.30
	5 639.25	H	10.56	8.66	-53.30	-51.40	-13.00	38.40
	7 520.25	V	12.12	9.45	-48.77	-46.10	-13.00	33.10
	9 399.00	V	13.30	10.18	-51.52	-48.40	-13.00	35.40

Test mode : 14A-n2A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 880.0
Channel : 376000
Bandwidth(㎒) : 10 (LTE), 15 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 759.00	H	8.61	6.96	-52.25	-50.60	-13.00	37.60
	5 643.75	V	10.56	8.66	-53.80	-51.90	-13.00	38.90
	7 518.75	H	12.12	9.45	-50.17	-47.50	-13.00	34.50
	9 400.50	H	13.30	10.23	-52.07	-49.00	-13.00	36.00

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

Test mode : 66A-n5A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 836.5
Channel : 167300
Bandwidth(㎒) : 10 (LTE), 15 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBd]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	1 670.40	V	5.96	5.12	-62.24	-61.40	-13.00	48.40
	2 507.20	H	6.21	5.98	-56.13	-55.90	-13.00	42.90
	3 345.60	H	7.81	6.80	-55.31	-54.30	-13.00	41.30
	4 178.40	H	9.04	7.30	-53.24	-51.50	-13.00	38.50

Test mode : 2A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 745.0
Channel : 349000
Bandwidth(㎒) : 5 (LTE), 10 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 480.75	H	8.24	6.92	-55.42	-54.10	-13.00	41.10
	5 220.75	H	10.33	8.50	-49.23	-47.40	-13.00	34.40
	6 961.50	H	11.45	10.11	-51.04	-49.70	-13.00	36.70
	8 705.25	H	13.18	10.09	-49.59	-46.50	-13.00	33.50

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

Test mode : 14A-n66A
Waveform / SCS(㎑) : DFT-s OFDM / 15
Frequency(㎒) : 1 745.0
Channel : 349000
Bandwidth(㎒) : 10 (LTE), 15 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	3 503.25	V	8.30	6.94	-56.36	-55.00	-13.00	42.00
	5 255.25	H	10.35	8.54	-50.01	-48.20	-13.00	35.20
	7 009.50	H	11.51	9.36	-52.65	-50.50	-13.00	37.50
	8 760.75	V	13.20	10.11	-50.69	-47.60	-13.00	34.60

Test mode : 14A-n77A
Waveform / SCS(㎑) : DFT-s OFDM / 30
Frequency(㎒) : 3 465.0
Channel : 631000
Bandwidth(㎒) : 10 (LTE), 30 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
16QAM	6 897.33	V	11.38	10.33	-50.25	-49.20	-13.00	36.20
	10 349.05	V	13.17	10.83	-47.44	-45.10	-13.00	32.10
	13 803.65	H	14.38	12.47	-45.91	-44.00	-13.00	31.00
	17 251.35	V	13.85	1.00	-55.15	-42.30	-13.00	29.30

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

Test mode	:	14A-n77A
Waveform / SCS(㎑)	:	DFT-s OFDM / 30
Frequency(㎒)	:	3 840.0
Channel	:	656000
Bandwidth(㎒)	:	10 (LTE), 40 (NR)

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
16QAM	7 642.53	V	12.21	9.64	-51.27	-48.70	-13.00	35.70
	11 461.67	V	13.39	10.74	-46.85	-44.20	-13.00	31.20
	15 285.42	H	14.31	12.29	-44.92	-42.90	-13.00	29.90
	19 098.00	V	11.50	16.33	-38.97	-43.80	-13.00	30.80

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

6. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	AGILENT	N9040B	MY57010132	23.10.14
Signal Generator	R&S	SMB100A	176206	24.01.19
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	23.08.10
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	23.08.10
High Pass Filter	Wainwright Instruments GmbH	WHKX8-5655-6500-18000-40SS	5	23.08.10
Band Reject Filter	Wainwright Instruments GmbH	WRCG 1710/1785-1690/1805-60/12SS	43	24.01.19
Radio Communication Analyzer	ANRITSU	MT8000A	6262093278	24.04.26*
Bilog Antenna	Teseq GmbH	CBL 6112D	62027	24.11.17
Bilog Antenna	ETS.LINDGREN	'3143B	228420	23.09.28
Horn Antenna	ETS-LINDGREN	3117	251528	24.02.02
Horn Antenna	ETS.LINDGREN	3117	227509	23.09.20
Horn Antenna	ETS-Lindgren	3116	00086632	24.01.25
Horn Antenna	ETS-LINDGREN	3116C	251516	24.02.02
Amplifier	SONOMA INSTRUMENT	310N	421822	23.12.14
Amplifier	C&K Technologies, Inc.	BZRT-00504000-481055-382525	26299-27735	23.09.19
Amplifier	C&K Technologies, Inc.	BZR-00504000-551028-252525	27736	23.09.19
Antenna Mast	innco systems GmbH	MA4640-XP-ET	N/A	-

* Tests related to this equipment were progressed after the calibration was completed.

End of test report