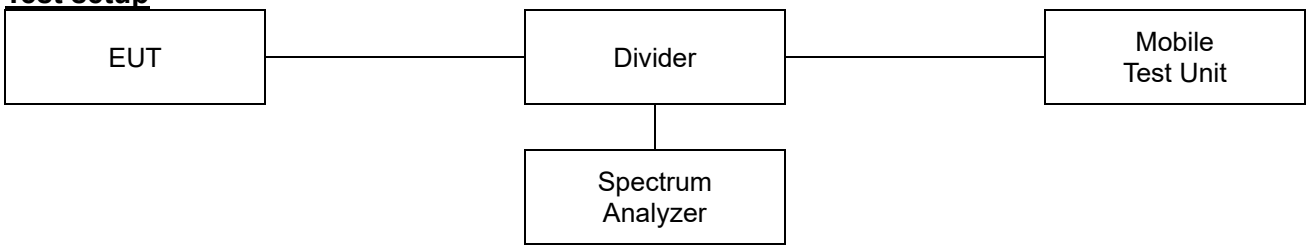
7.4. Spurious Emissions at Antenna Terminal

Test setup



Limit

According to §96.41(e) The conducted power of emissions below 3530 ㎒ or above 3720 ㎒ shall not exceed −40㏈m/㎒.

Test procedure

971168 D01 v03r01 - Section 6
ANSI 63.26-2015 – Section 5.7

Test settings

1) Start frequency was set to 30 ㎒ and stop frequency was set to at least 10th the fundamental frequency.
2) Detector = RMS
3) Sweep time = auto couple.
4) Trace mode = trace average
5) Allow trace to fully stabilize.
6) Please see test notes below RBW and VBW settings.

Notes:

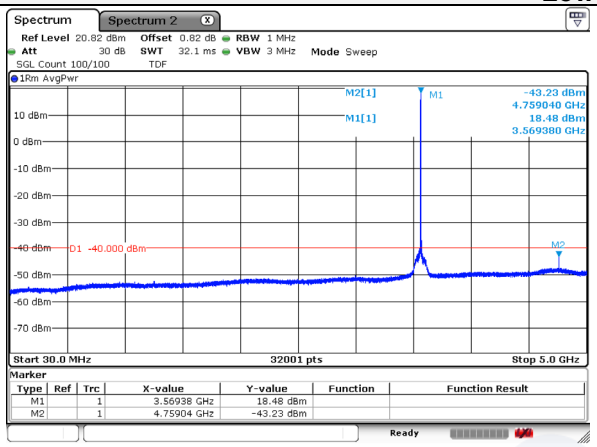
1. Per 22.917(b) and RSS-132(5.5), compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 ㎑ or greater for frequencies less than 1 ㎓ and 1 ㎒ or greater for frequencies greater than 1 ㎓.
   The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 ㏈ below the transmitter power.
2. All modes of operation were investigated and the worst-case configuration results are reported.

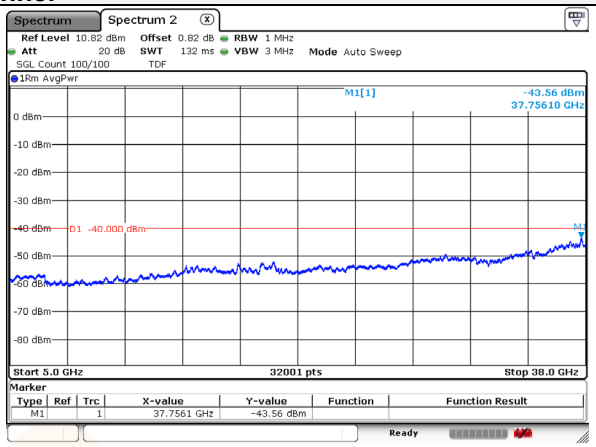
Test results

Test mode: LTE ULCA 48C

20M + 5M RB1/99 + RB1/0 QPSK

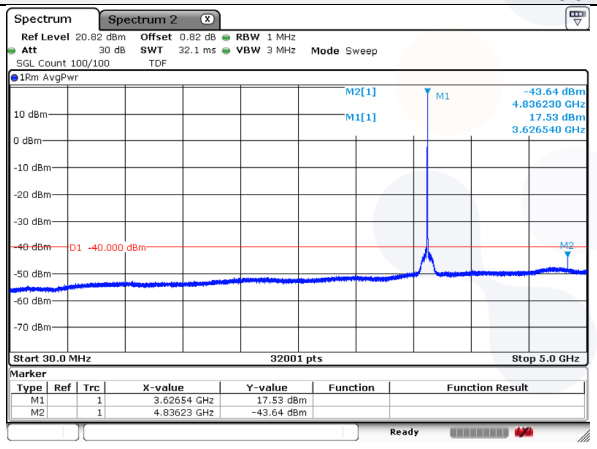
Low channel

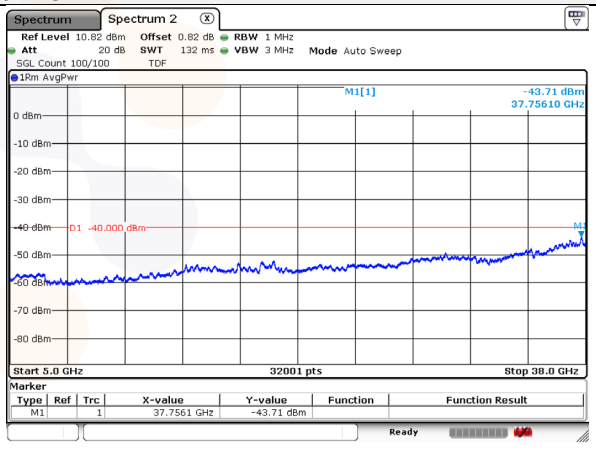




20M + 15M RB1/99 + RB1/0 QPSK

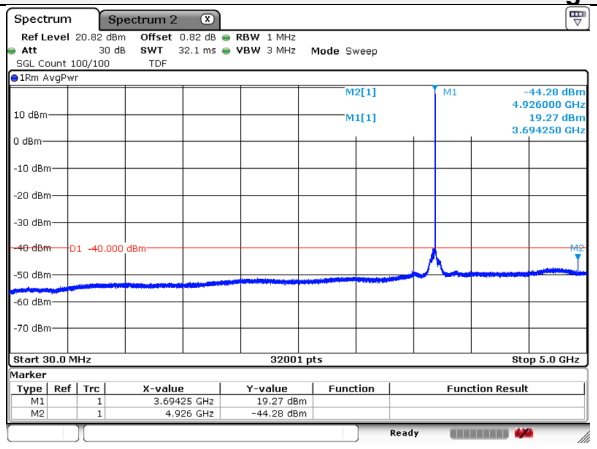
Middle channel

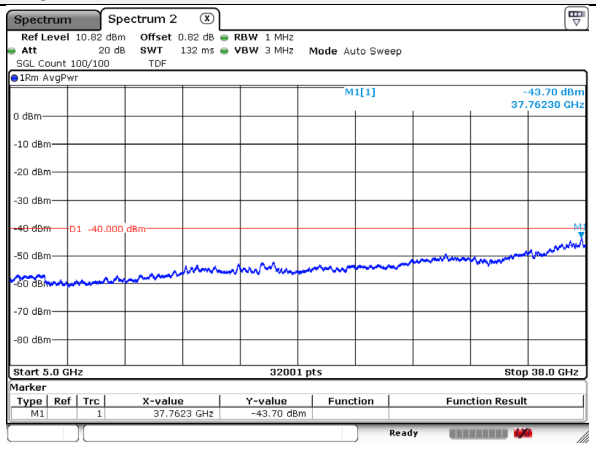




20M + 5M RB1/99 + RB1/0 QPSK

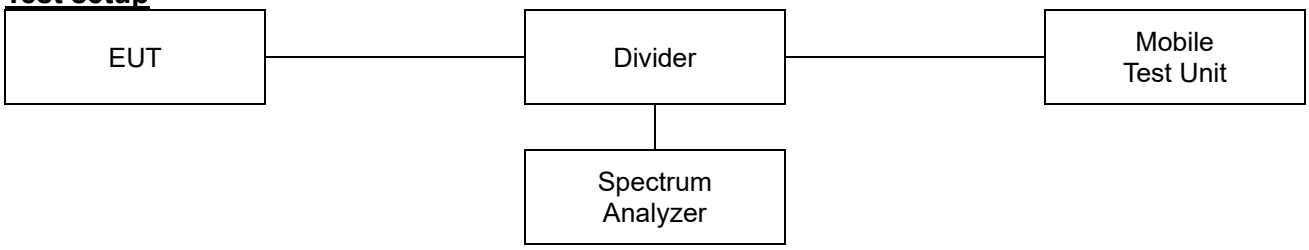
High channel





7.5. Peak to Average Power Ratio (PAPR)

Test setup



Limit

According to RSS-192(5.5), the peak-to-average ratio(PAR) of the transmission must not exceed 13 dB.

Test procedure

971168 D01 v03r01 - Section 5.7.2
971168 D02 v02r02 – Section VII
ANSI 63.26-2015 – Section 5.2.3.4

Test settings

5.2.3.4 Measurement of peak power in a broadband noise-like signal using CCDF

1) Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth
2) Set the number of counts to a value that stabilizes the measured CCDF curve.
3) Set the measurement interval as follows:
   a) For continuous transmissions, set to the greater of [10 x (number of points in sweep) x (transmission symbol period)] or 1 ms.
   b) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement internal to a time that is less than or equal to the burst duration.
   c) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4) Record the maximum PAPR level associated with a probability of 0.1%

5.2.6 Peak-to-average power ratio

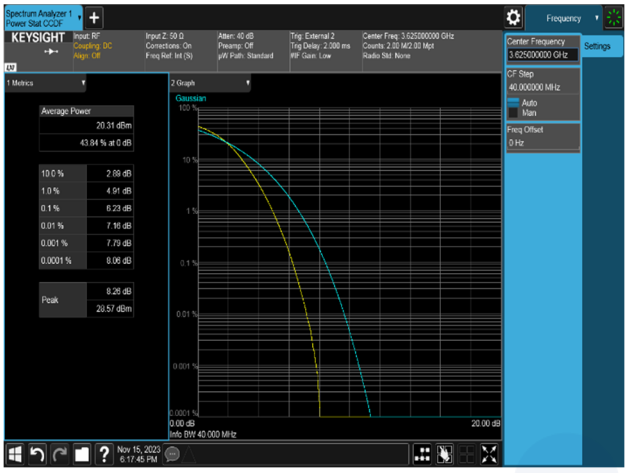
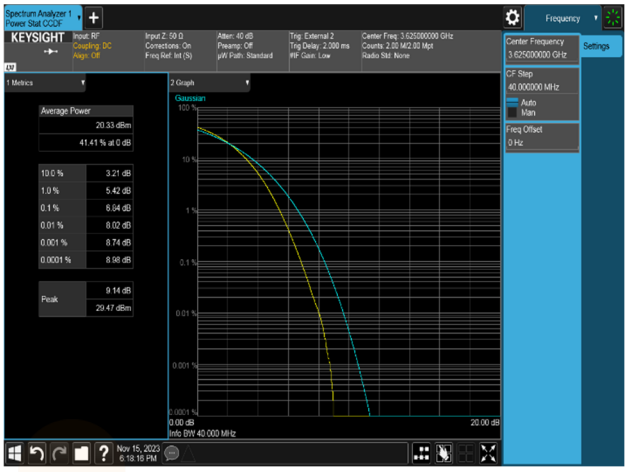
1) Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK}.
2) Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as PAG. Determine the P.A.P.R from:
3) PAPR(dB) = PPK (dBm or dBW) - PAG(dBm or dBW)

Notes:

1. All modes of operation were investigated and the worst-case configuration results are reported.

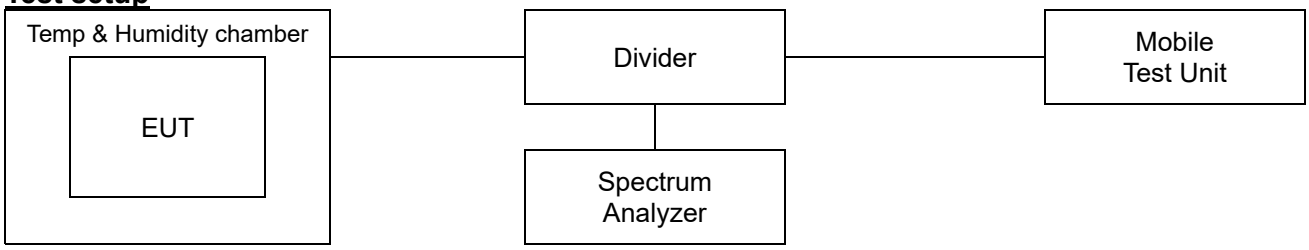
Test results

Test mode: LTE ULCA 48C

20M + 20M RB100/0 + RB100/0 QPSK Mid ch.	20M + 20M RB100/0 + RB100/0 16QAM Mid ch.
	

7.6. Frequency stability

Test setup



Limit

According to §2.1055(a),

The frequency stability shall be measured with variation of ambient temperature as follows:

1) From -30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
2) From -20° to + 50° centigrade for equipment to be licensed for use in the maritime services under part 80 of this chapter, except for class A, B, and S emergency position indicating radio beacons (EPIRBS), and equipment to be licensed for use above 952 ㎒ at operational fixed stations in all services, stations in the local television transmission service and point-to-point microwave radio service under part 21 of this chapter, equipment licensed for use aboard aircraft in the aviation services under part 87 of this chapter, and equipment authorized for use in the family radio service under part 95 of this chapter.
3) From 0° to + 50° centigrade for equipment to be licensed for use in the radio broadcast Services under part 73 of this chapter.

According to §2.1055(d),

The frequency stability shall be measured with variation of primary supply Voltage as follows:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacturer.
3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

Test procedure

ANSI 63.26-2015 – Section 5.6

Test settings

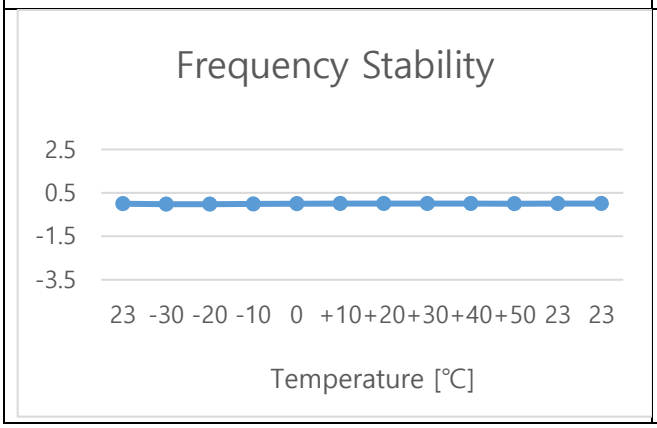
1) The carrier frequency of the transmitter is measured at room temperature. (20°C to provide a reference)
2) The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3) Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each Temperature level.

Test results

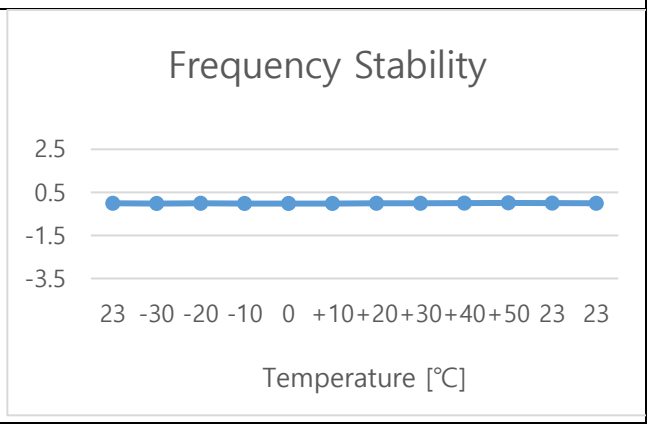
Test mode	:	LTE ULCA 48C	
Component Carrier	:	PCC	SCC
Frequency (㎐)	:	3 615 100 000	3 634 900 000
Channel	:	55891	56089
Bandwidth(㎒)	:	20	20
RB Size/Offset		100/0	100/0
Deviation limit	:	Emissions must remain in band	

Power (V)	Temp. (°C)	PCC				SCC			
		Frequency	Tolerance	Deviation		Frequency	Tolerance	Deviation	
		(㎐)	(㎐)	(ppm)	(%)	(㎐)	(㎐)	(ppm)	(%)
3.85*	+23(Ref)	3,615,100,001	1.23	0.0	0.000 000	3,634,899,996	-4.45	0.0	0.000 000
	-30	3,615,099,992	-8.06	0.0	0.000 000	3,634,899,994	-5.53	0.0	0.000 000
	-20	3,615,099,995	-5.50	0.0	0.000 000	3,634,899,996	-4.03	0.0	0.000 000
	-10	3,615,099,996	-4.19	0.0	0.000 000	3,634,899,993	-7.44	0.0	0.000 000
	0	3,615,100,001	1.04	0.0	0.000 000	3,634,899,991	-9.04	0.0	0.000 000
	+10	3,615,100,004	3.58	0.0	0.000 000	3,634,899,994	-5.69	0.0	0.000 000
	+20	3,615,100,003	2.55	0.0	0.000 000	3,634,899,997	-3.33	0.0	0.000 000
	+30	3,615,100,005	5.09	0.0	0.000 000	3,634,899,997	-2.58	0.0	0.000 000
	+40	3,615,100,004	4.10	0.0	0.000 000	3,634,899,999	-1.08	0.0	0.000 000
	+50	3,615,100,002	1.69	0.0	0.000 000	3,634,900,002	2.44	0.0	0.000 000
4.43*	+23(Ref)	3,615,100,003	3.20	0.0	0.000 000	3,634,900,001	1.09	0.0	0.000 000
3.40*	+23(Ref)	3,615,100,004	4.28	0.0	0.000 000	3,634,899,995	-5.02	0.0	0.000 000

PCC



SCC

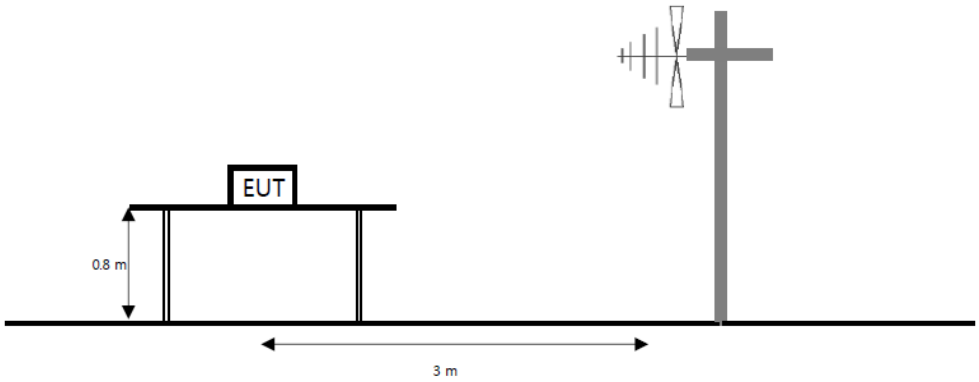


*Battery condition:
- Rated battery status: DC 3.85 V
- 115 % of rated battery status: DC 4.43 V
- End point: DC 3.40 V

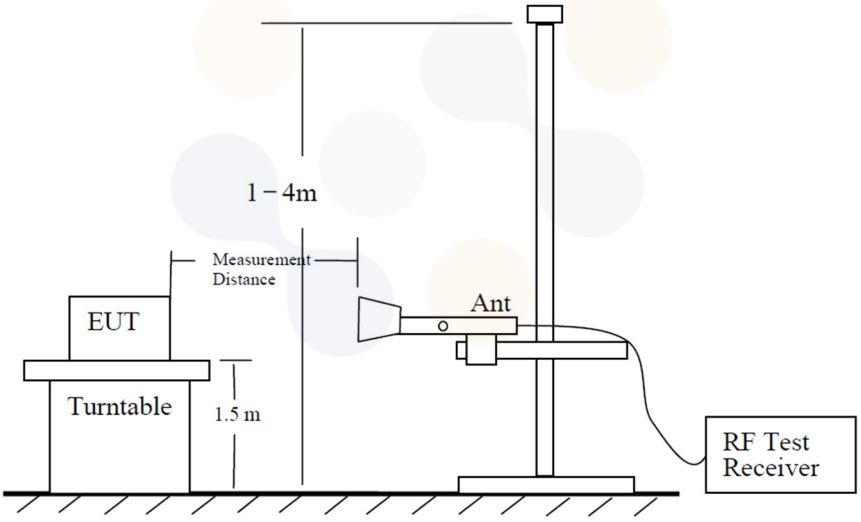
7.7. Radiated Power (ERP/EIRP)

Test setup

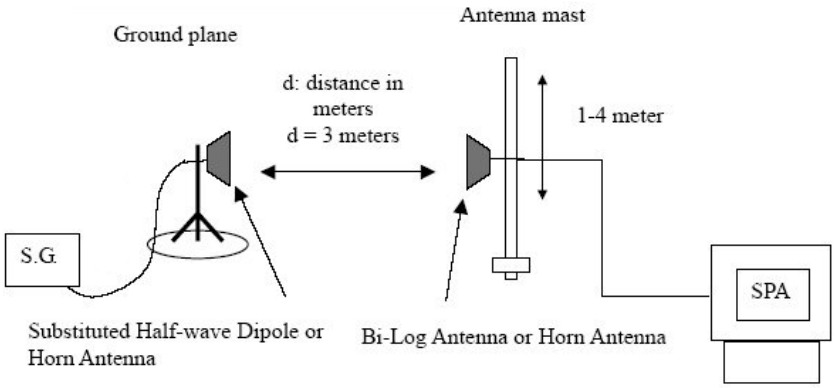
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §96.41(b), The maximum effective isotropic radiated power (EIRP) of any CBSD and End User Device shall not exceed 23dBm/MHz.

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(dBm) = Pg(dBm) – Cable loss (dB) + Antenna gain (dB)

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 dBm, 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 ULCA 48C

Modulation: QPSK

Ch.	PCC				SCC				Pol. [V/H]	Antenna Gain [dBi]	C.L [dB]	Substitute Level [dBm]	EIRP	
	BW (MHz)	Freq. (MHz)	RB	RB offset	BW (MHz)	Freq. (MHz)	RB	RB offset					[dBm]	[W]
Low	5	3 553.3	1	24	20	3 565.0	1	0	H	8.40	12.92	23.10	18.58	0.072
	20	3 560.0	1	99	5	3 571.7	1	0	H	8.41	12.92	22.97	18.46	0.070
	10	3 555.5	1	49	20	3 569.9	1	0	H	8.40	12.93	23.06	18.53	0.071
	20	3 560.0	1	99	10	3 574.4	1	0	H	8.41	12.92	23.12	18.61	0.073
	15	3 557.8	1	74	20	3 574.9	1	0	H	8.40	12.93	23.02	18.49	0.071
	20	3 560.0	1	99	15	3 577.1	1	0	H	8.41	12.92	22.75	18.24	0.067
	20	3 560.0	1	99	20	3 579.8	1	0	H	8.41	12.92	22.94	18.43	0.070
Mid	5	3 615.8	1	24	20	3 627.5	1	0	H	8.51	12.88	22.88	18.51	0.071
	20	3 622.5	1	99	5	3 634.2	1	0	H	8.52	12.87	22.80	18.45	0.070
	10	3 615.6	1	49	20	3 630.0	1	0	H	8.51	12.88	22.75	18.38	0.069
	20	3 620.1	1	99	10	3 634.5	1	0	H	8.52	12.87	22.67	18.32	0.068
	15	3 615.3	1	74	20	3 632.4	1	0	H	8.51	12.88	22.47	18.10	0.065
	20	3 617.6	1	99	15	3 634.7	1	0	H	8.51	12.87	22.57	18.21	0.066
	20	3 615.1	1	99	20	3 634.9	1	0	H	8.51	12.88	22.32	17.95	0.062
High	5	3 678.3	1	24	20	3 690.0	1	0	H	8.62	12.30	22.13	18.45	0.070
	20	3 685.0	1	99	5	3 696.7	1	0	H	8.63	12.31	21.88	18.20	0.066
	10	3 675.6	1	49	20	3 690.0	1	0	H	8.62	12.30	21.68	18.00	0.063
	20	3 680.1	1	99	10	3 694.5	1	0	H	8.62	12.30	22.02	18.34	0.068
	15	3 672.9	1	74	20	3 690.0	1	0	H	8.61	12.29	21.27	17.59	0.057
	20	3 675.1	1	99	15	3 692.2	1	0	H	8.62	12.30	21.83	18.15	0.065
	20	3 670.2	1	99	20	3 690.0	1	0	H	8.61	12.29	21.71	18.03	0.064

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

Modulation: 16QAM

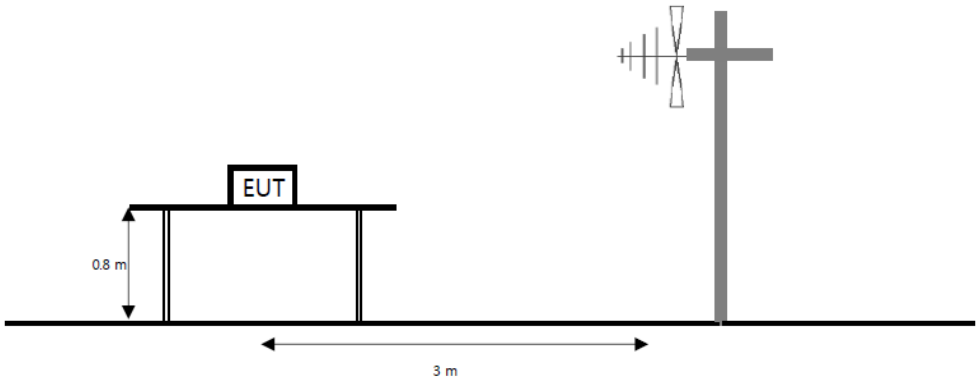
Ch.	PCC				SCC				Pol. [V/H]	Antenna Gain [dBi]	C.L [dB]	Substitute Level [dBm]	EIRP	
	BW (MHz)	Freq. (MHz)	RB	RB offset	BW (MHz)	Freq. (MHz)	RB	RB offset					[dBm]	[W]
Low	5	3 553.3	1	24	20	3 565.0	1	0	H	8.40	12.92	22.19	17.67	0.058
	20	3 560.0	1	99	5	3 571.7	1	0	H	8.41	12.92	21.80	17.29	0.054
	10	3 555.5	1	49	20	3 569.9	1	0	H	8.40	12.93	22.15	17.62	0.058
	20	3 560.0	1	99	10	3 574.4	1	0	H	8.41	12.92	22.21	17.70	0.059
	15	3 557.8	1	74	20	3 574.9	1	0	H	8.40	12.93	22.40	17.87	0.061
	20	3 560.0	1	99	15	3 577.1	1	0	H	8.41	12.92	21.86	17.35	0.054
	20	3 560.0	1	99	20	3 579.8	1	0	H	8.41	12.92	22.01	17.50	0.056
Mid	5	3 615.8	1	24	20	3 627.5	1	0	H	8.51	12.88	21.60	17.23	0.053
	20	3 622.5	1	99	5	3 634.2	1	0	H	8.52	12.87	21.76	17.41	0.055
	10	3 615.6	1	49	20	3 630.0	1	0	H	8.51	12.88	21.64	17.27	0.053
	20	3 620.1	1	99	10	3 634.5	1	0	H	8.52	12.87	21.72	17.37	0.055
	15	3 615.3	1	74	20	3 632.4	1	0	H	8.51	12.88	21.59	17.22	0.053
	20	3 617.6	1	99	15	3 634.7	1	0	H	8.51	12.87	21.39	17.03	0.050
	20	3 615.1	1	99	20	3 634.9	1	0	H	8.51	12.88	21.45	17.08	0.051
High	5	3 678.3	1	24	20	3 690.0	1	0	H	8.62	12.30	21.22	17.54	0.057
	20	3 685.0	1	99	5	3 696.7	1	0	H	8.63	12.31	21.02	17.34	0.054
	10	3 675.6	1	49	20	3 690.0	1	0	H	8.62	12.30	20.85	17.17	0.052
	20	3 680.1	1	99	10	3 694.5	1	0	H	8.62	12.30	20.94	17.26	0.053
	15	3 672.9	1	74	20	3 690.0	1	0	H	8.61	12.29	20.56	16.88	0.049
	20	3 675.1	1	99	15	3 692.2	1	0	H	8.62	12.30	20.89	17.21	0.053
	20	3 670.2	1	99	20	3 690.0	1	0	H	8.61	12.29	20.72	17.04	0.051

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBd&dBi) - C.L(Cable loss) (dB)

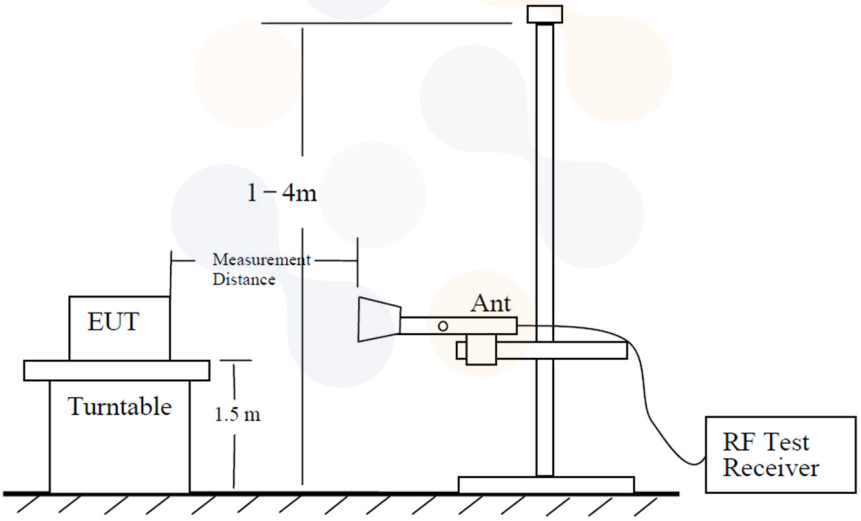
7.8. Radiated Spurious Emissions

Test setup

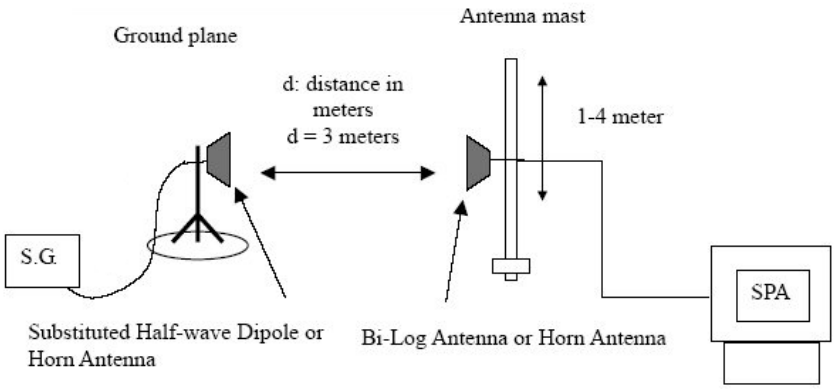
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



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 §96.41(e) 3.5 GHz Emissions and Interference Limits
(1) General protection levels
(ii) Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by a CBSD to End User Devices, the conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed −25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed −25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

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 dBm, 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

Operating Frequency : Low

Test Mode	PCC				SCC			
	BW (㎒)	Freq. (㎒)	RB	RB offset	BW (㎒)	Freq. (㎒)	RB	RB offset
LTE ULCA 48C	20	3 560.0	1	99	10	3 574.4	1	0

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	4 758.91	V	9.96	14.09	-43.27	-47.40	-40.00	7.40
	7 136.88	V	11.59	19.13	-45.66	-53.20	-40.00	13.20
	10 706.70	V	13.20	24.30	-39.30	-50.40	-40.00	10.40
	14 283.71	H	14.23	30.10	-33.43	-49.30	-40.00	9.30
	17 849.22	H	14.10	34.24	-34.36	-54.50	-40.00	14.50

Operating Frequency : Middle

Test Mode	PCC				SCC			
	BW (㎒)	Freq. (㎒)	RB	RB offset	BW (㎒)	Freq. (㎒)	RB	RB offset
LTE ULCA 48C	20	3 620.1	1	99	10	3 634.5	1	0

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	4 839.33	H	10.08	14.64	-45.04	-49.60	-40.00	9.60
	7 260.37	V	11.76	18.90	-44.86	-52.00	-40.00	12.00
	10 886.92	V	13.20	24.70	-38.00	-49.50	-40.00	9.50
	14 522.80	H	14.10	29.77	-34.23	-49.90	-40.00	9.90
	18 151.19	H	11.30	31.26	-31.04	-51.00	-40.00	11.00

Note.

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

Operating Frequency : High

Test Mode	PCC				SCC			
	BW (㎒)	Freq. (㎒)	RB	RB offset	BW (㎒)	Freq. (㎒)	RB	RB offset
LTE ULCA 48C	20	3 680.1	1	99	10	3 694.5	1	0

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
QPSK	4 919.02	H	10.19	15.31	-44.48	-49.60	-40.00	9.60
	7 380.28	V	11.93	19.42	-44.81	-52.30	-40.00	12.30
	11 071.44	V	13.21	24.56	-37.95	-49.30	-40.00	9.30
	14 763.32	V	14.05	30.85	-33.70	-50.50	-40.00	10.50
	18 447.92	V	11.30	31.66	-30.94	-51.30	-40.00	11.30

Note.

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

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV40-N	101462	24.10.12*
PXA Signal Analyzer	KEYSIGHT	N9040B	US56050101	24.07.03
Spectrum Analyzer	AGILENT	N9040B	US55230151	24.07.03
Vector Signal Generator	R&S	SMBV100A	257566	24.07.04
Signal Generator	R&S	SMB100A	176206	24.01.19
Divider	Marki Microwave, Inc.	PD-0040	D0002	24.07.04
Wideband Radio Communication Tester	R&S	CMW500	141780	24.01.19
Wideband Radio Communication Tester	R&S	CMW500	132120	24.04.25
Temp & Humid Chamber	ESPEC CORP.	SH-642	93016978	24.01.19
High Pass Filter	Wainwright Instruments GmbH	WHKX10-900-1000-15000-40SS	11	24.07.04
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	32	24.07.04
High Pass Filter	Wainwright Instruments GmbH	WHNX10-4050-4500-26500-40CC	SN3	24.10.16*
High Pass Filter	QOTANA TECHNOLOGIES	DBHF0508004000A	20070100016	24.07.04
Bilog Antenna	Teseq GmbH	CBL 6112D	62027	24.11.17**
Bilog Antenna	ETS.LINDGREN	3143B	228420	25.07.20
Horn Antenna	ETS-LINDGREN	3117	251528	24.02.02
Horn Antenna	ETS.LINDGREN	3117	227509	24.07.12
Horn Antenna	ETS-Lindgren	3116	00086635	24.03.20
Horn Antenna	ETS-LINDGREN	3116C	251516	24.02.02
Amplifier	SONOMA INSTRUMENT	310N	421822	24.10.12*
Amplifier	C&K Technologies, Inc.	BZR-00504000-551028-252525	27736	24.07.04
Amplifier	C&K Technologies, Inc.	BZRT-00504000-481055-382525	26299-27735	24.07.04
Antenna Mast	innco systems GmbH	MA4640-XP-ET	N/A	-
Controller	innco systems GmbH	CO3000	1175/4585031 9/P	-

*This equipment was calibrated during the test period, and was used after calibration.
**This equipment was calibrated during the test period, and was used before calibration.

End of test report