



TEST REPORT

Eurofins KCTL Co.,Ltd. 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-70-4904-0113 FAX: 82-505-299-8311 www.kctl.co.kr	Report No.: KR26-SRF0029-D Page (1) of (35)	 KCTL
1. Client		
◦ Name : Ceres Tag LTD ◦ Address : 58-62 Gilbert Road, Lutwyche, Queensland 4030, Australia ◦ Date of Receipt : 2026-02-03		
2. Use of Report : Certification		
3. Name of Product / Model : Animal Traceability Device / LX800W		
4. Manufacturer / Country of Origin : Ceres Tag LTD / Australia		
5. FCC ID : 2A2O3-LX800W		
6. IC Certificate No. : 27547-LX800W		
5. Date of Test : 2026-03-13 to 2026-04-01		
6. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing (Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)		
7. Test method used : FCC Part 2 FCC Part 25 Subpart C RSS-170 Issue 4 September 2022 RSS-Gen Issue 5 February 2021		
8. Test Result : Refer to the test result in the test report		
Affirmation	Tested by  Name : Kyeol Kang (Signature)	Technical Manager  Name : Kwonse Kim (Signature)
	2026-05-15	
Eurofins KCTL Co.,Ltd.		
As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by Eurofins KCTL Co.,Ltd.		

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REPORT REVISION HISTORY

Date	Revision	Page No
2026-04-16	Originally issued	-
2026-05-04	Added the Equipment class and PMN	4
2026-05-07	Updated the note	8
2026-05-08	Updated PMN and output power values	4, 8
2026-05-15	Updated the power table	8

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Note. The report No. KR26-SRF0029-C is superseded by the report No. KR26-SRF0029-D.

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

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1. General information

Client : Ceres Tag LTD
 Address : 58-62 Gilbert Road, Lutwyche, Queensland 4030, Australia
 Manufacturer : Ceres Tag LTD
 Address : 58-62 Gilbert Road, Lutwyche, Queensland 4030, Australia
 Factory : ESCATEC Electronics Sdn. Bhd.
 Address : Industrial Zone 4, 11900 Bayan Lepas, Penang, Malaysia
 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

PMN : CERES GEN
 Equipment under test : Animal Traceability Device
 Model : LX800W
 Frequency range : 1 611.25 MHz ~ 1 618.75 MHz (Satellite)
 Modulation technique : BPSK
 Number of channels : 4ch
 Power source : DC 5 V
 Antenna type : PCB Inverted-F Antenna
 Antenna Gain : 1.06 dBi
 Equipment class : MES (Mobile earth station)
 Software version : 2.2.0
 Hardware version : R2
 Test device serial No. : N/A
 Operation temperature : -10 °C ~ 55 °C

2.1. Frequency/channel operations

This device contains the following capabilities:

Satellite

Ch.	Frequency (MHz)
A	1 611.25
B	1 613.75
C	1 616.25
D	1 618.75

Table 2.1.1. Satellite



3. Summary of tests

FCC Part section(s)	IC Rule reference	Parameter	Test Limit	Test Condition	Test results
2.1046, 25.204(a)	RSS-170 (5.5)	Transmitter output power	Must meet the limits specified in 25.204(a) and RSS-170(5.5)	Conducted	Pass
2.1049	RSS-Gen (6.7)	Occupied bandwidth.	N/A		Pass
2.1051, 25.202(f)	RSS-170 (5.8)	Emission mask – within 250% of Authorized bandwidth	Must meet the limits specified in 25.202(f) and RSS-170(5.8)		Pass
		Out of band emissions			Pass
25.202(d)	RSS-170 (5.3)	Frequency Stability	< 0.001% of reference frequency		Pass
25.202(f)	RSS-170 (5.8)	Radiated Spurious Emissions	<-13 dBm/MHz	Radiated	Pass
25.216(c)(g)	RSS-170 (5.9)	Additional unwanted emission (1559 ~ 1610 MHz)	<-70 dBW/MHz for emissions in the band 1559 ~ 1605 MHz; <-10 dBW/MHz at 1610 MHz		Pass
25.216(i)	RSS-170 (5.10)	Carrier-off state emissions (1559 ~ 1610 MHz)	<-80 dBW/MHz for emissions in the band 1559 ~ 1610 MHz		Pass

Notes:

- The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z It was determined that **X** orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in **X** orientation.
- 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
 - ◆ FCC 03-283

4. Measurement uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014+C63.4a-2017.

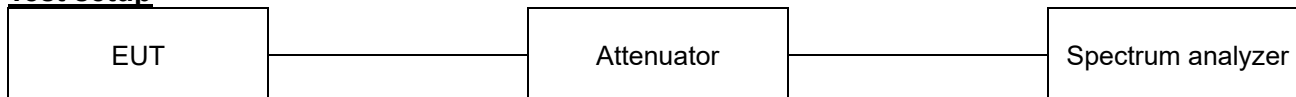
All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicated a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and thus, can be compared directly to specified limits to determine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

Parameter	Expanded uncertainty (±)	
Conducted Output Power	0.9 dB	
Channel Bandwidth	0.9 %	
Frequency stability	0.03 ppm	
Conducted spurious emission	1.7 dB	
Radiated Power, Radiated spurious Emissions (Bandedge, restricted band)	Below 1 000 MHz	2.5 dB
	1 000 MHz ~ 18 000 MHz	2.5 dB
	Above 1 8000 MHz	2.6 dB

5. Test results

5.1. Transmitter output power

Test setup



Limit

According to §25.204(a),

(a) In bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+ 40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+ 40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$

where θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

According to RSS-170(5.5),

The application for MES certification shall state the MES e.i.r.p. that is necessary for satisfactory communication. The maximum permissible e.i.r.p. will be the stated e.i.r.p. plus a 2 dB margin. If a detachable antenna is used, the certification application shall state the recommended antenna type and manufacturer, the antenna gain and the maximum transmitter output power at the antenna terminal.

Test procedure

971168 D01 v03r01 – Section 5.2

ANSI C63.26-2015 – Section 5.2.4, 5.2.5.5

Test settings

The relevant equation for determining the maximum EIRP from the RF output power measured is:

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

Where:

- a) EIRP: Equivalent isotropic radiated power (expressed in the same units as P_{Meas} , typically dB W or dB m)
- b) P_{Meas} : measured transmitter output power or PSD, in dB W or dB m
- c) G_T : gain of the transmitting antenna, in dB i (EIRP)

Note:

1. The output power was measured on the EUT antenna port using SMA cable with attenuator connected to a spectrum analyzer and utilizing the band power function.

Test results

Conducted output power measurement result for FCC

Test Channel	Frequency [MHz]	Average Output power [dB m/4 kHz]	ANT Gain [dB i]	E.I.R.P. [dB m/4 kHz]	Limit [dB m/4 kHz]	Margin [dB]
A	1 611.25	21.69	1.06	22.75	70.00	47.25
B	1 613.75	21.76	1.06	22.82	70.00	47.18
C	1 616.25	21.77	1.06	22.83	70.00	47.17
D	1 618.75	21.72	1.06	22.78	70.00	47.22

Note:

- Output power (dBm/4kHz) = Output power (dBm/3kHz) + 10log(4kHz/3kHz)

Conducted output power measurement result for IC

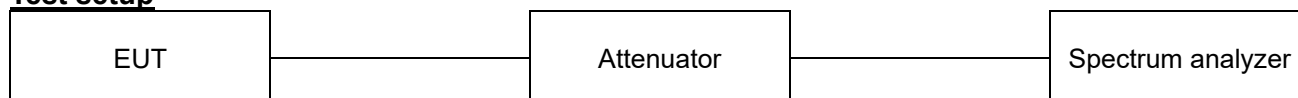
Test Channel	Frequency [MHz]	Average Output power [dB m]	ANT Gain [dB i]	Stated EIRP [dB m]	E.I.R.P. [dB m]	Maximum permissible EIRP [dB m]	Margin [dB]
A	1 611.25	21.95	1.06	27.00	23.01	29.00	5.99
B	1 613.75	21.98	1.06	27.00	23.04	29.00	5.96
C	1 616.25	21.93	1.06	27.00	22.99	29.00	6.01
D	1 618.75	21.90	1.06	27.00	22.96	29.00	6.04

Note:

- Maximum permissible EIRP, dBm = Stated EIRP + 2 dB

5.2. Occupied bandwidth

Test setup



Limit

According to §2.1049,

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

Test procedure

971168 D01 v03r01 – Section 4.3

ANSI C63.26-2015 – Section 5.4.4

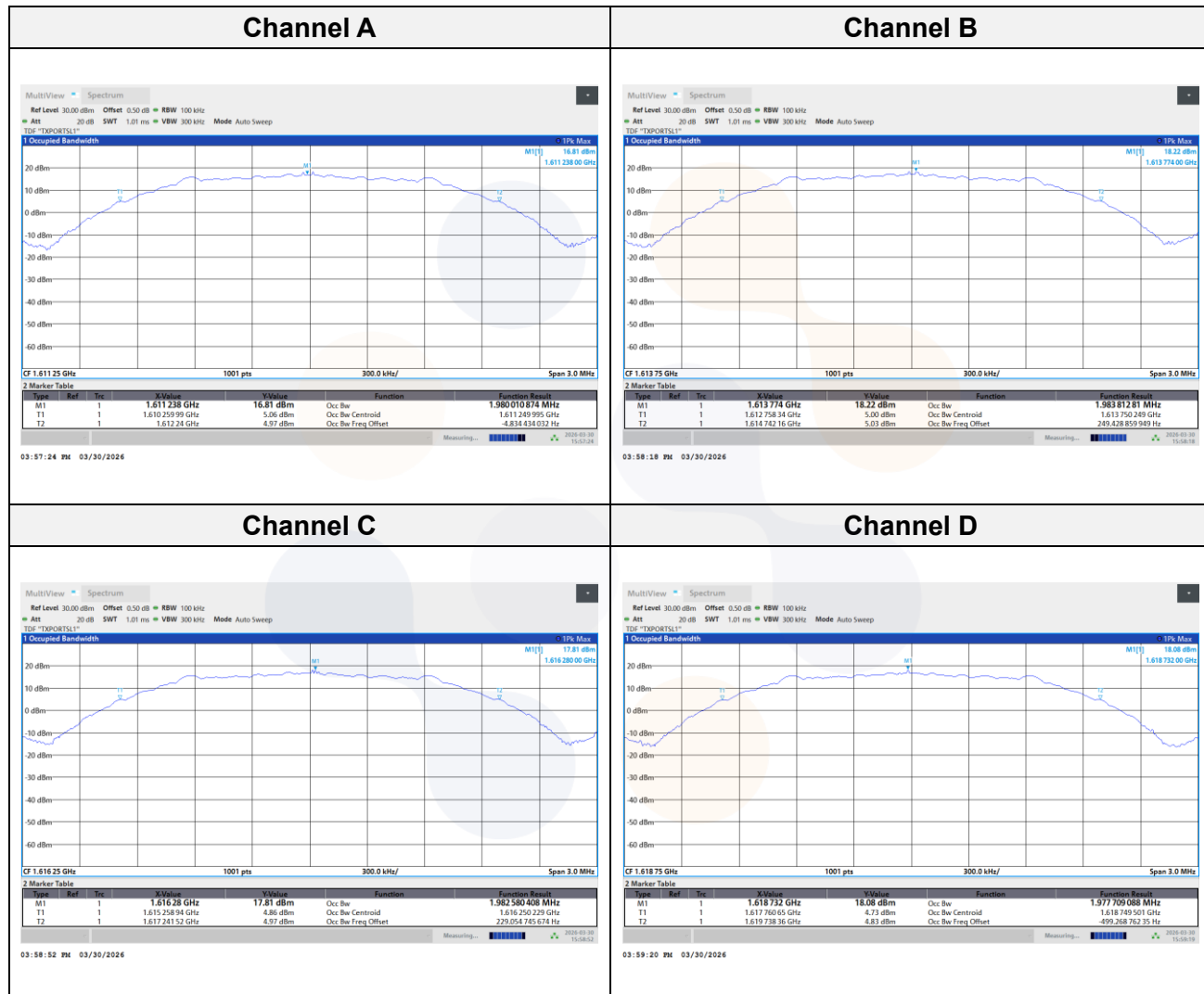
Test settings

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of $1.5 \times \text{OBW}$ is sufficient).
- The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
- Set the detection mode to peak, and the trace mode to max-hold.
- If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.
- The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

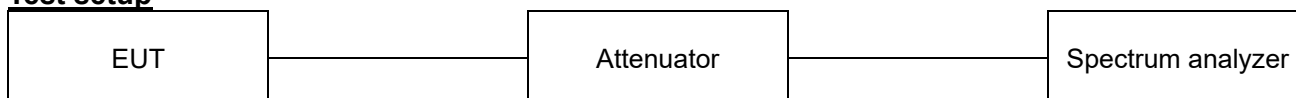
Test results

Test Channel	Frequency [MHz]	Occupied Bandwidth [MHz]
A	1 611.25	1.980
B	1 613.75	1.984
C	1 616.25	1.983
D	1 618.75	1.978



5.3. Emission mask within 250% of Authorized bandwidth

Test setup



Limit

According to §25.202(f),

Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

- (1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
- (2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;

According to RSS-170(5.8),

The average power of unwanted emissions shall be attenuated below the average output power, P (dBW), of the transmitter, as specified below:

- a. 25 dB in any 4 kHz, the frequency of which is offset from the channel centre frequency by more than 50%, up to and including 100% of the occupied bandwidth or necessary bandwidth, whichever is greater
- b. 35 dB in any 4 kHz, the frequency of which is offset from the channel centre frequency by more than 100%, up to and including 250% of the occupied bandwidth or necessary bandwidth, whichever is greater

Test procedure

971168 D01 v03r01 – Section 6
 ANSI C63.26-2015 – Section 5.7

Test settings

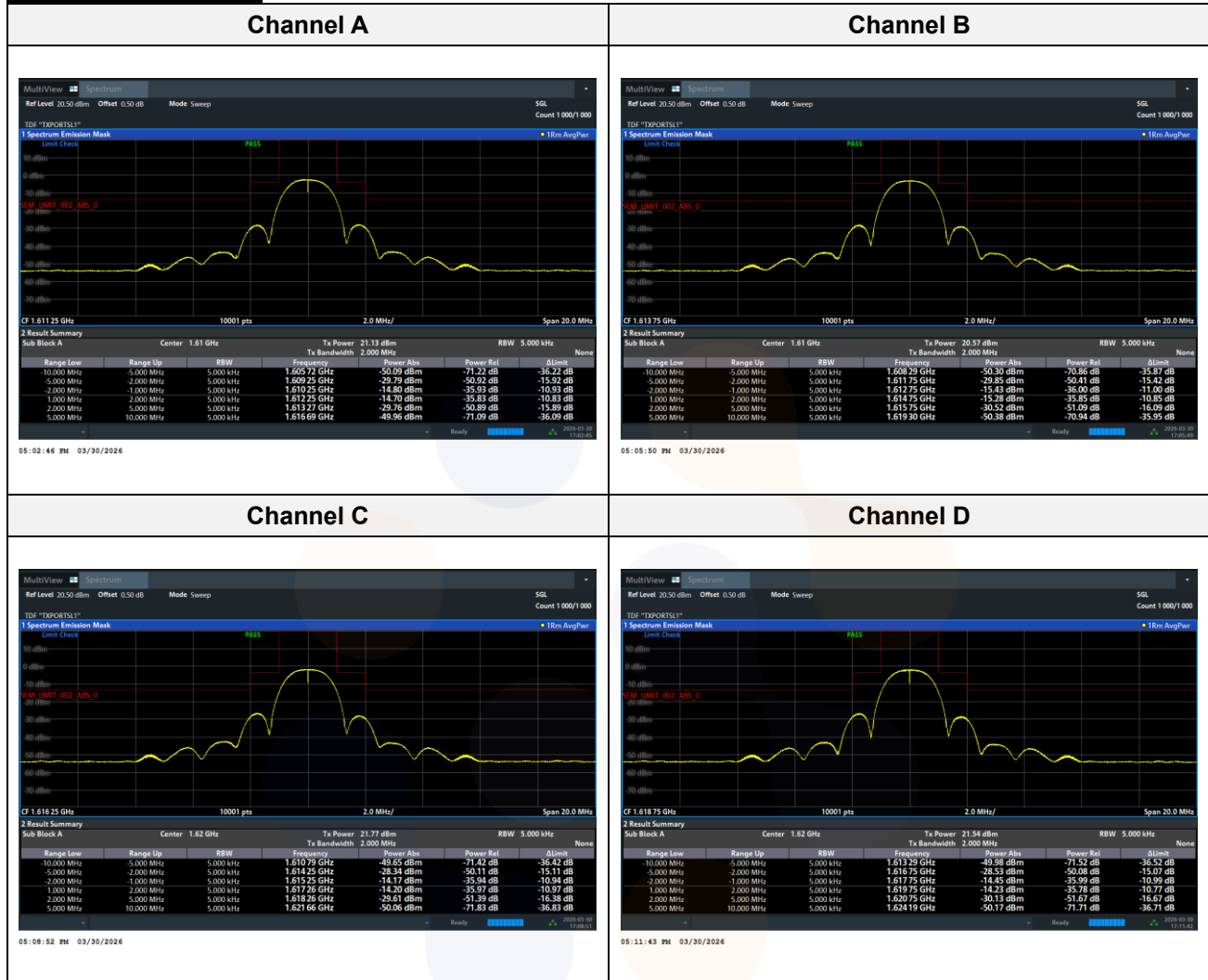
- 1) Set the RBW ≥ 4 kHz
- 2) Set the VBW $\geq 3 \times$ RBW
- 3) Detector = RMS
- 4) Trace mode = trace average
- 5) Trace was allowed to stabilize

Note:

1. The manufacturer has declared an authorized bandwidth of 2 MHz.
2. Due to measurement equipment limitations, an RBW of 4 kHz is not available. To ensure worst-case results an RBW = 5 kHz was utilized for conducted emission mask measurement.

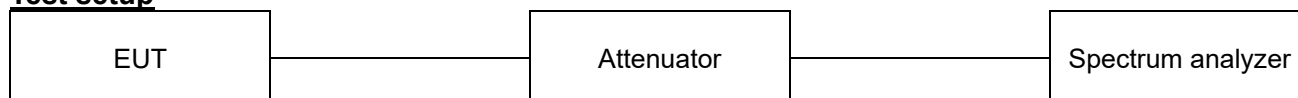
Test results

Test mode: Satellite



5.4. Out of band emissions

Test setup



Limit

According to §25.202(f),

Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

- (3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

According to RSS-170(5.8),

The average power of unwanted emissions shall be attenuated below the average output power, P (dBW), of the transmitter, as specified below:

- c. $43 + 10 \log p$ (watts) in any 4 kHz, the frequency of which is offset from the channel centre frequency by more than 250% of the occupied bandwidth or necessary bandwidth, whichever is greater

Test procedure

971168 D01 v03r01 – Section 6
 ANSI C63.26-2015 – Section 5.7

Test settings

- 1) Start frequency was set to 30 MHz 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

Note:

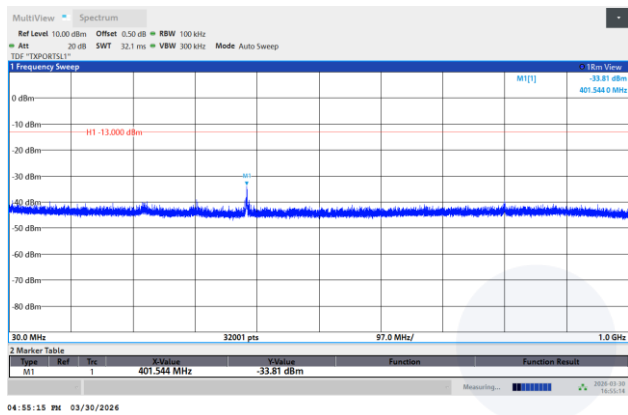
1. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz.

Test results

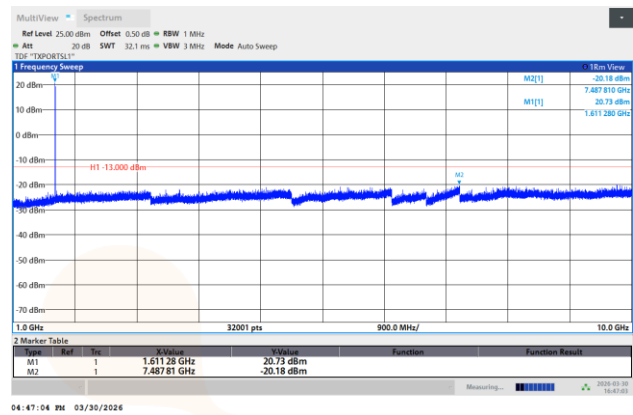
Test mode: Satellite

Channel A

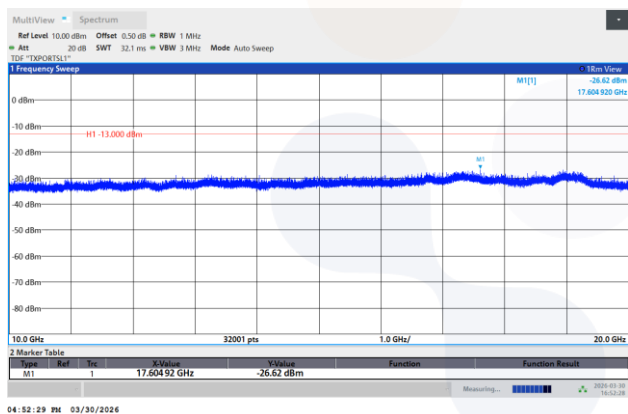
30 MHz ~ 1 000 MHz



1 000 MHz ~ 10 000 MHz



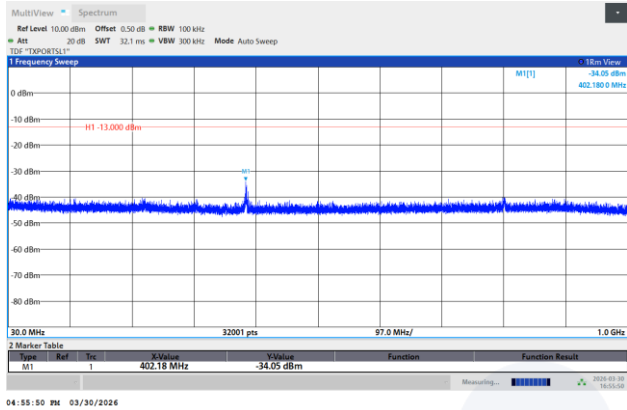
10 000 MHz ~ 20 000 MHz



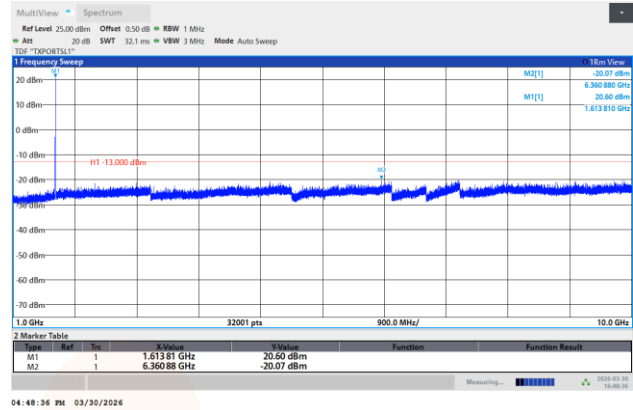
Blank

Channel B

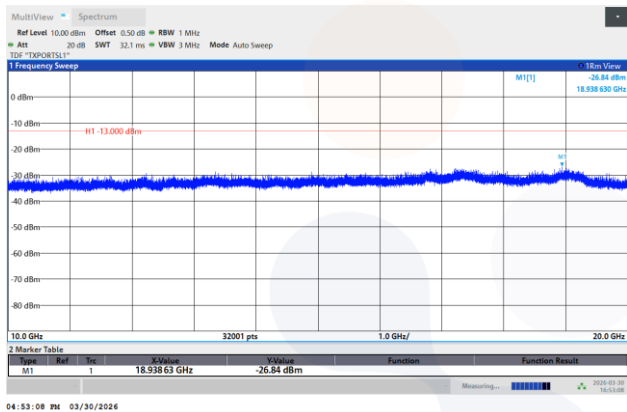
30 MHz ~ 1 000 MHz



1 000 MHz ~ 10 000 MHz



10 000 MHz ~ 20 000 MHz

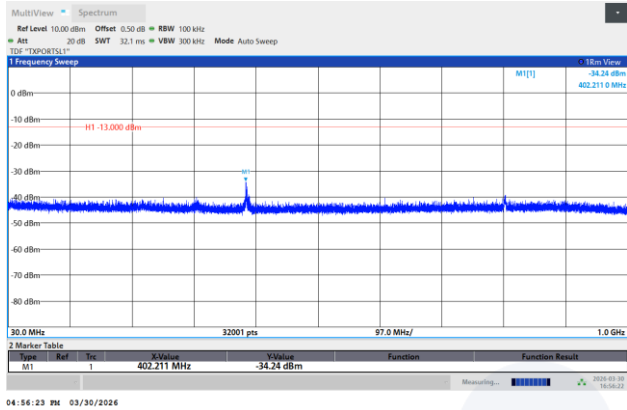


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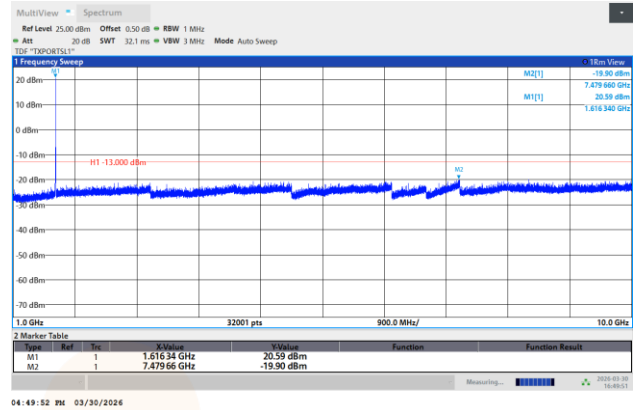
Blank

Channel C

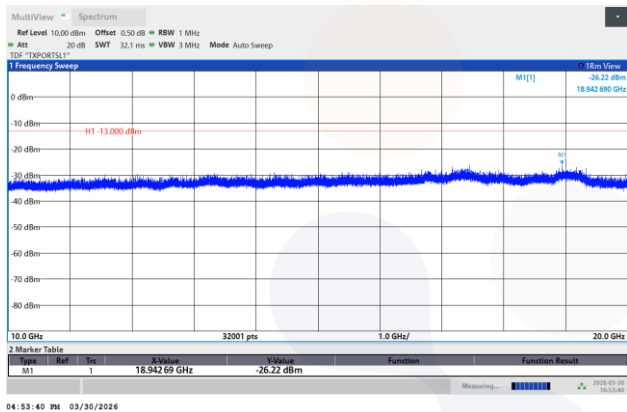
30 MHz ~ 1 000 MHz



1 000 MHz ~ 10 000 MHz



10 000 MHz ~ 20 000 MHz

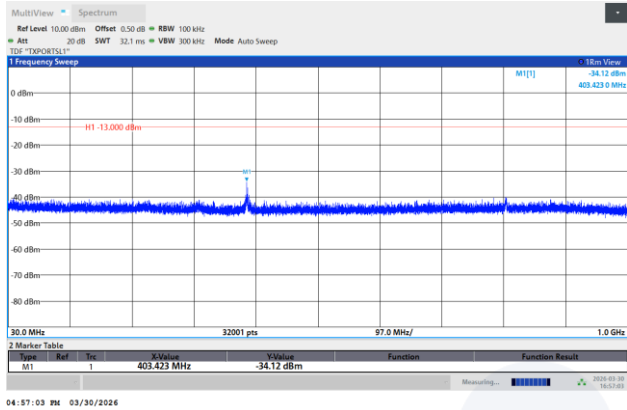


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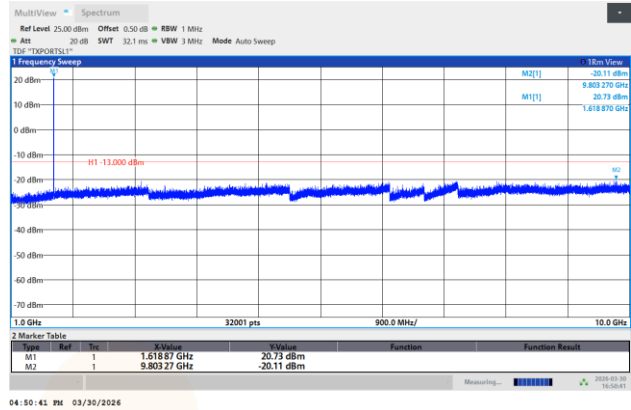
Blank

Channel D

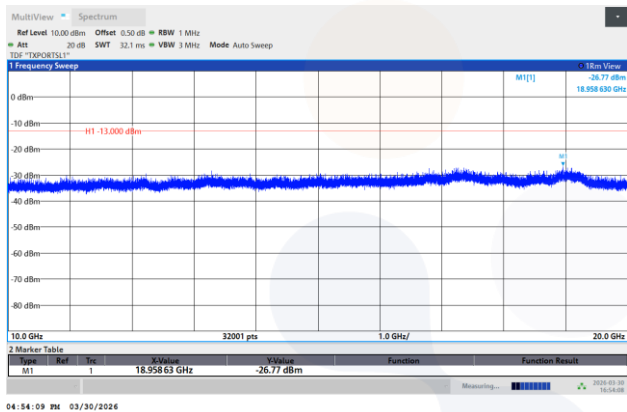
30 MHz ~ 1 000 MHz



1 000 MHz ~ 10 000 MHz



10 000 MHz ~ 20 000 MHz



Blank

5.5. Frequency stability

Test setup



Limit

According to 25.202(d),

The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

According to RSS-170(5.3),

For mobile earth station equipment, the carrier frequency shall not depart from the reference frequency by more than ± 10 ppm.

Test procedure

ANSI 63.26-2015 – Section 5.6

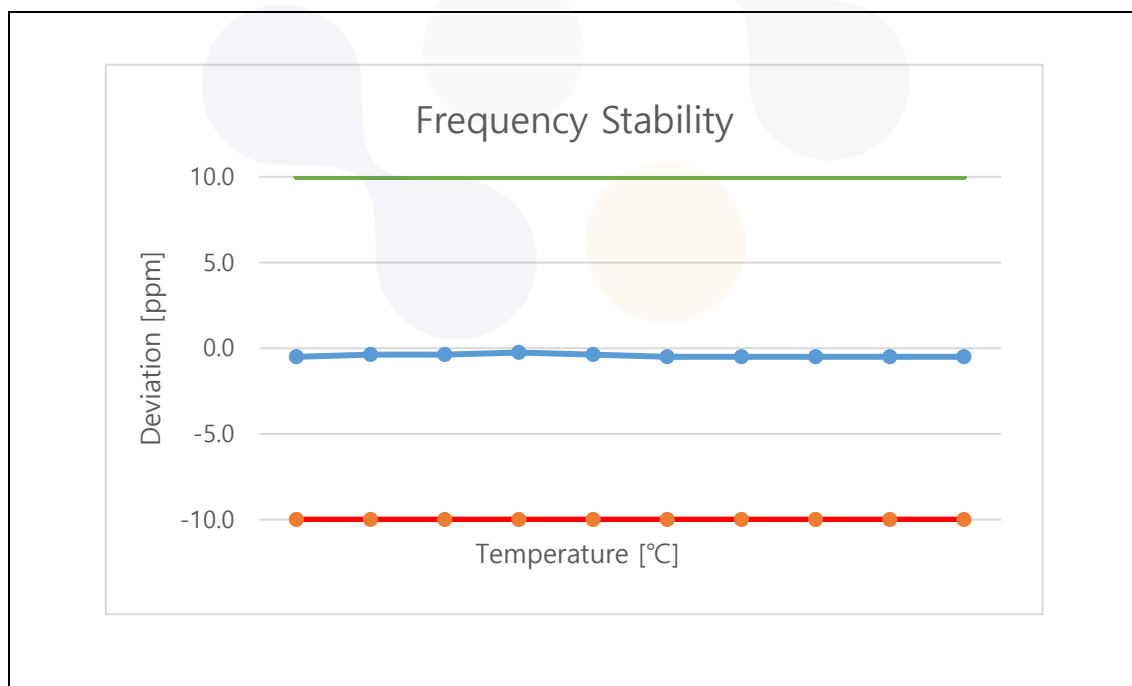
Test settings

- 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

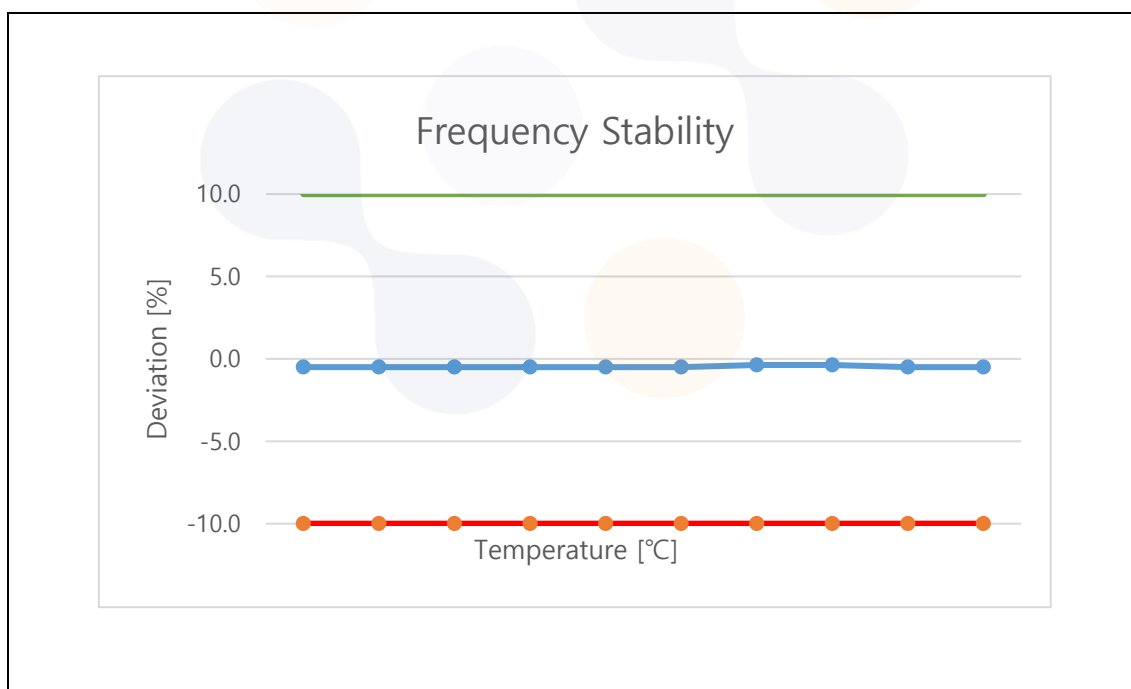
Test mode : Satellite
 Frequency (Hz) : 1 611 250 000
 Channel : A
 Deviation limit : 0.001 % (FCC), ±10 ppm (IC)

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	5.00	+22(Ref)	1,611,249,200	-800	-0.5	-0.000050
		-10	1,611,249,400	-600	-0.4	-0.000037
		0	1,611,249,400	-600	-0.4	-0.000037
		+10	1,611,249,600	-400	-0.3	-0.000025
		+20	1,611,249,400	-600	-0.4	-0.000037
		+30	1,611,249,200	-800	-0.5	-0.000050
		+40	1,611,249,200	-800	-0.5	-0.000050
		+50	1,611,249,200	-800	-0.5	-0.000050
115%	5.75	+22(Ref)	1,611,249,200	-800	-0.5	-0.000050
End point	4.25	+22(Ref)	1,611,249,200	-800	-0.5	-0.000050



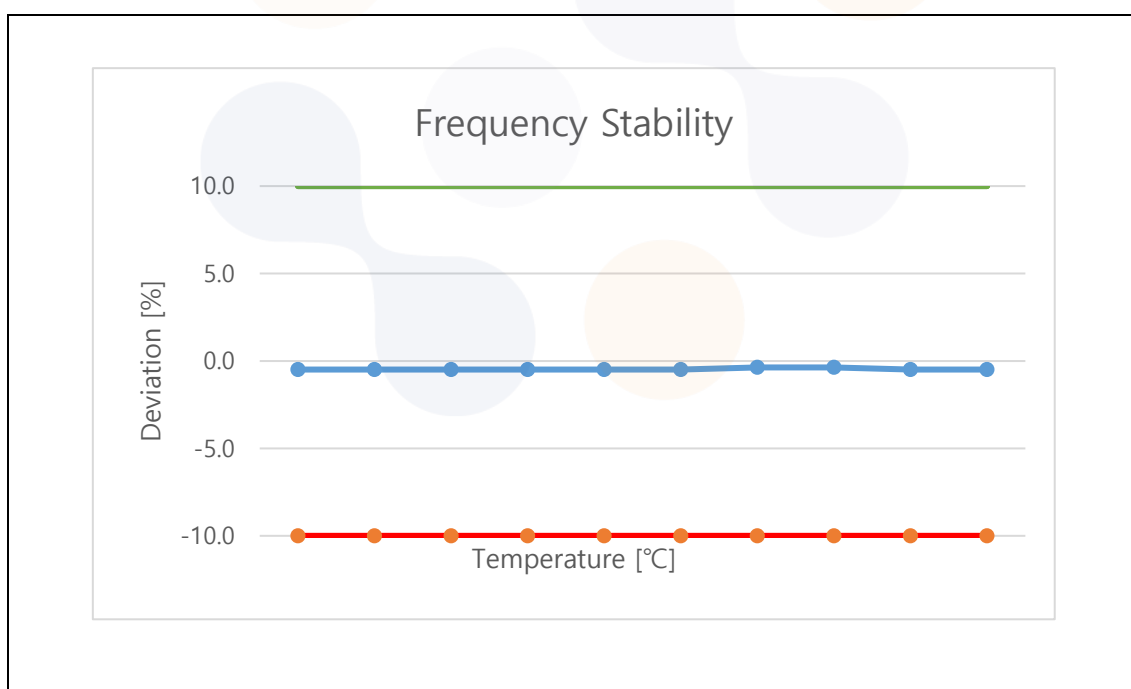
Test mode : Satellite
 Frequency (Hz) : 1 613 750 000
 Channel : B
 Deviation limit : 0.001 % (FCC), ±10 ppm (IC)

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	5.00	+23(Ref)	1,613,749,200	-800	-0.5	-0.000050
		-10	1,613,749,200	-800	-0.5	-0.000050
		0	1,613,749,200	-800	-0.5	-0.000050
		+10	1,613,749,200	-800	-0.5	-0.000050
		+20	1,613,749,200	-800	-0.5	-0.000050
		+30	1,613,749,200	-800	-0.5	-0.000050
		+40	1,613,749,400	-600	-0.4	-0.000037
		+50	1,613,749,400	-600	-0.4	-0.000037
115%	5.75	+23(Ref)	1,613,749,200	-800	-0.5	-0.000050
End point	4.25	+23(Ref)	1,613,749,200	-800	-0.5	-0.000050



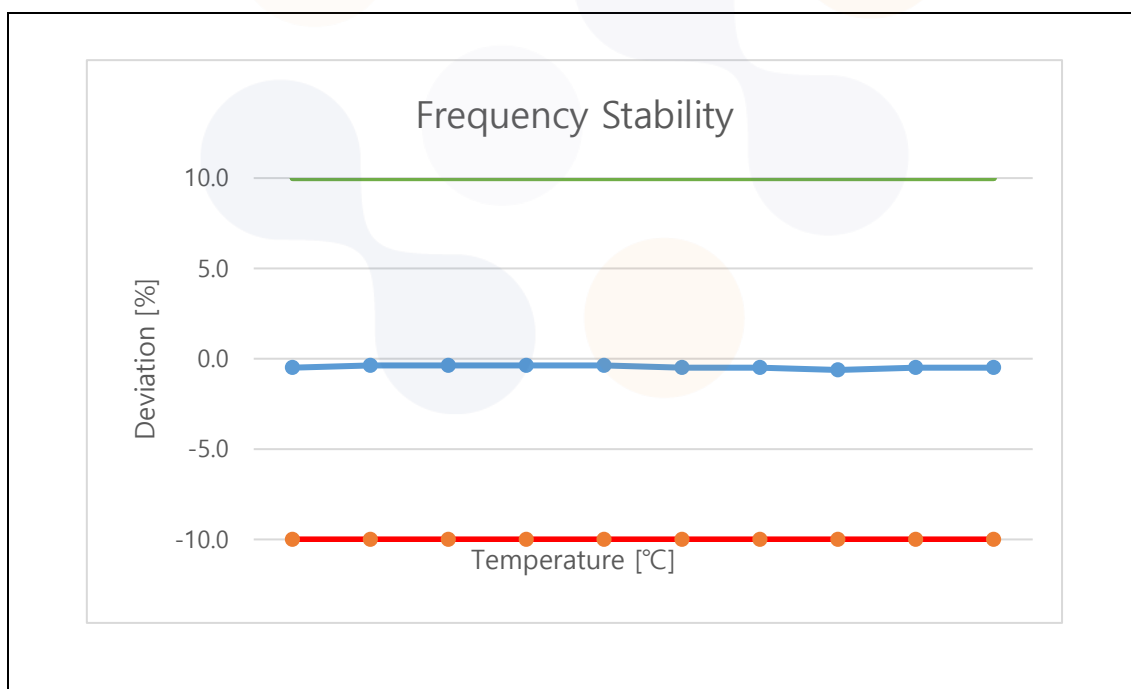
Test mode : Satellite
 Frequency (Hz) : 1 616 250 000
 Channel : C
 Deviation limit : 0.001 % (FCC), ±10 ppm (IC)

Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	5.00	+23(Ref)	1,616,249,200	-800	-0.5	-0.000049
		-10	1,616,249,200	-800	-0.5	-0.000049
		0	1,616,249,200	-800	-0.5	-0.000049
		+10	1,616,249,200	-800	-0.5	-0.000049
		+20	1,616,249,200	-800	-0.5	-0.000049
		+30	1,616,249,200	-800	-0.5	-0.000049
		+40	1,616,249,400	-600	-0.4	-0.000037
		+50	1,616,249,400	-600	-0.4	-0.000037
115%	5.75	+23(Ref)	1,616,249,200	-800	-0.5	-0.000049
End point	4.25	+23(Ref)	1,616,249,200	-800	-0.5	-0.000049



Test mode : Satellite
 Frequency (Hz) : 1 618 750 000
 Channel : D
 Deviation limit : 0.001 % (FCC), ±10 ppm (IC)

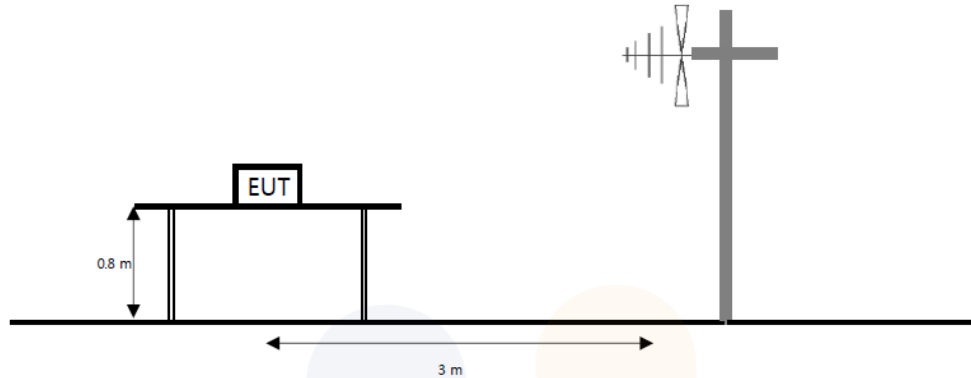
Voltage (%)	Power (V)	Temp. (°C)	Frequency (Hz)	Frequency error (Hz)	Deviation	
					(ppm)	(%)
100%	5.00	+23(Ref)	1,618,749,200	-800	-0.5	-0.000049
		-10	1,618,749,400	-600	-0.4	-0.000037
		0	1,618,749,400	-600	-0.4	-0.000037
		+10	1,618,749,400	-600	-0.4	-0.000037
		+20	1,618,749,400	-600	-0.4	-0.000037
		+30	1,618,749,200	-800	-0.5	-0.000049
		+40	1,618,749,200	-800	-0.5	-0.000049
		+50	1,618,749,000	-1,000	-0.6	-0.000062
115%	5.75	+23(Ref)	1,618,749,200	-800	-0.5	-0.000049
End point	4.25	+23(Ref)	1,618,749,200	-800	-0.5	-0.000049



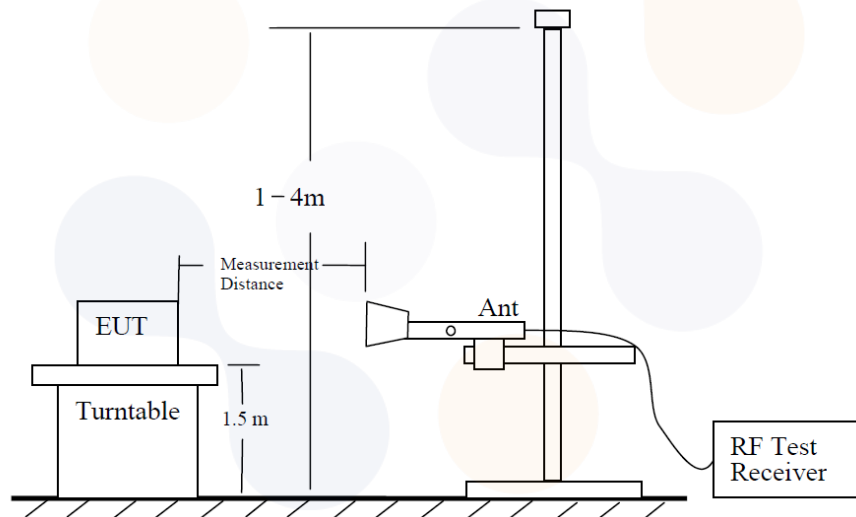
5.6. Radiated spurious emissions

Test setup

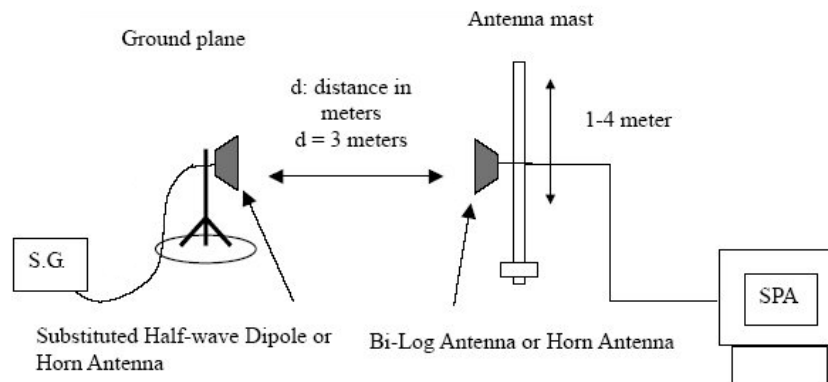
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



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



The diagram below shows the test setup for substituted method.



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Limit

According to §25.202(f),

Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

- (4) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

According to RSS-170(5.8),

The average power of unwanted emissions shall be attenuated below the average output power, P (dBW), of the transmitter, as specified below:

- d. $43 + 10 \log p$ (watts) in any 4 kHz, the frequency of which is offset from the channel centre frequency by more than 250% of the occupied bandwidth or necessary bandwidth, whichever is greater

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 kHz for below 1 GHz and 1 MHz for above 1 GHz.
- 2) VBW $\geq 3 \times$ RBW.
- 3) Detector = RMS
- 4) Trace mode = Max hold
- 5) Sweep time = Auto couple
- 6) Number of sweep points $\geq 2 \times \text{span} / \text{RBW}$
- 7) Allow trace to fully stabilize.

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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 GHz below) or horn antenna (1 GHz 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 (Above 1 000 MHz)

Test mode : Satellite

Frequency(MHz) : 1 611.25

Channel : A

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	3 222.00	H	7.47	13.23	-31.34	-37.10	-13.00	24.10
	4 833.00	H	9.87	16.15	-33.12	-39.40	-13.00	26.40
	6 444.75	H	10.74	18.83	-39.81	-47.90	-13.00	34.90
	8 055.00	H	12.46	19.89	-40.47	-47.90	-13.00	34.90
	9 666.75	V	13.03	21.93	-36.80	-45.70	-13.00	32.70

Test mode : Satellite

Frequency(MHz) : 1 613.75

Channel : B

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	3 227.50	H	7.48	13.25	-31.73	-37.50	-13.00	24.50
	4 841.00	H	9.88	16.16	-35.12	-41.40	-13.00	28.40
	6 455.00	H	10.76	18.84	-39.02	-47.10	-13.00	34.10
	8 070.00	V	12.47	19.93	-40.34	-47.80	-13.00	34.80
	9 682.00	V	13.02	21.92	-34.90	-43.80	-13.00	30.80

Test mode : Satellite

Frequency(MHz) : 1 616.25

Channel : C

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	3 232.50	H	7.50	13.26	-32.04	-37.80	-13.00	24.80
	4 848.50	H	9.90	16.17	-35.23	-41.50	-13.00	28.50
	6 465.00	H	10.77	18.84	-38.33	-46.40	-13.00	33.40
	8 080.50	H	12.48	19.97	-40.51	-48.00	-13.00	35.00
	9 699.50	V	13.00	21.91	-35.59	-44.50	-13.00	31.50

Note.

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

Test mode : Satellite

Frequency(MHz) : 1 618.75

Channel : D

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	3 237.50	H	7.51	13.28	-31.63	-37.40	-13.00	24.40
	4 856.00	H	9.91	16.18	-36.03	-42.30	-13.00	29.30
	6 475.00	H	10.78	18.85	-37.13	-45.20	-13.00	32.20
	8 092.50	H	12.49	20.01	-39.18	-46.70	-13.00	33.70
	9 712.50	V	13.00	21.90	-35.00	-43.90	-13.00	30.90

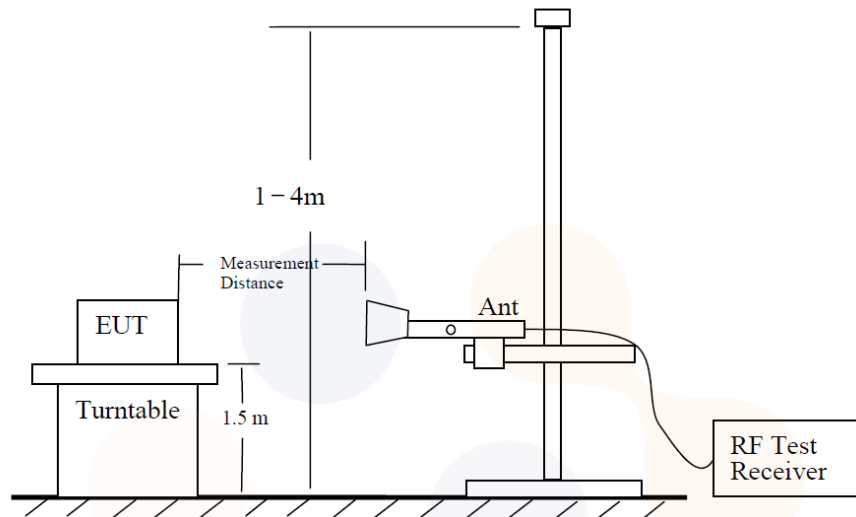
Note.

1. $E.I.R.P(dBm) = \text{Substitute Level}(dB) + \text{Antenna gain}(dBi) - C.L(\text{Cable loss}) (dB)$

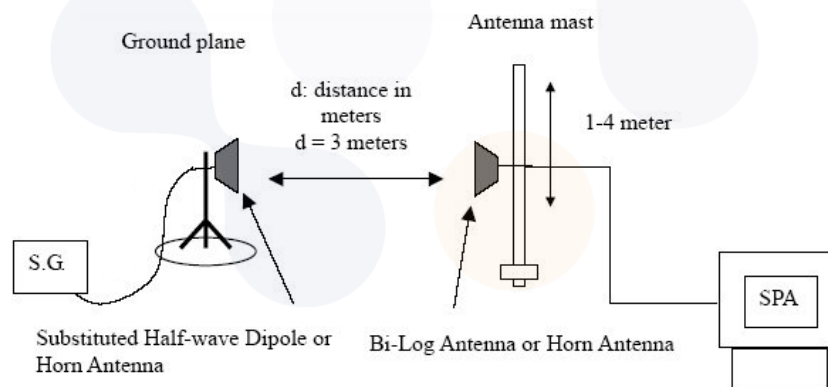
5.7. Additional unwanted emission (1559 ~ 1610 MHz)

Test setup

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



The diagram below shows the test setup for substituted method.



Limit

According to §25.216(c),

The e.i.r.p. density of emissions from mobile earth stations placed in service after July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1660.5 MHz shall not exceed -70 dB W/MHz, averaged over any 2 millisecond active transmission interval, in the band 1559-1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed -80 dB W, averaged over any 2 millisecond active transmission interval, in the 1559-1605 MHz band.

According to §25.216(g),

The e.i.r.p density of emissions from mobile earth stations with assigned uplink frequencies between 1990 MHz and 2025 MHz shall not exceed -70 dB W/MHz, averaged over any 2 millisecond active transmission interval, in frequencies between 1559 MHz and 1610 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations between 1559 MHz and 1605 MHz shall not exceed -80 dB W, averaged over any 2 millisecond active transmission interval. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth from such stations between 1605 MHz and 1610 MHz manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 shall not exceed -80 dB W, averaged over any 2 millisecond active transmission interval.

According to RSS-170(5.9),

MESs with transmitting frequencies in the bands 1610 – 1626.5 MHz and 1626.5 – 1660.5 MHz shall comply with the unwanted emission limits specified in this section, where applicable, in addition to the limits in section 5.8.

According to RSS-170(5.9.1), Band 1610 – 1626.5 MHz

For MESs with transmitting frequencies between 1610 MHz and 1626.5 MHz, the e.i.r.p. density of unwanted emissions shall not exceed the limits shown below, which are the same as those for the band 1605 – 1610 MHz, averaged over any 2 ms active transmission interval:

- a. -70 dBW/MHz at 1605 MHz, linearly interpolated to -10 dBW/MHz at 1610 MHz, for broadband emissions
- b. -80 dBW/kHz at 1605 MHz, linearly interpolated to -20 dBW/kHz at 1610 MHz, for discrete emissions

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 = 1 MHz
- 2) VBW ≥ 3 × RBW.
- 3) Span = 1559 – 1610 MHz
- 4) Detector = RMS
- 5) Trace mode = Max hold
- 6) Allow trace to fully stabilize.

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Notes:

1. On a test site, the EUT shall be placed at 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 horn antenna (1 GHz 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.
11. Both horizontal / vertical polarizations and Low/Mid/High channels were investigated.
Low channel was found to be worst case.

Test results

Test mode : Satellite (Wide band 1 559 MHz - 1 610 MHz)

Frequency(MHz) : 1 611.25

Channel : A

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	1 604.98	H	6.08	9.53	-40.45	-43.90	-40.00	3.90
	1 610.00	H	6.06	9.56	9.60	6.10	20.00	13.90

Test mode : Satellite (Narrow Band 1 559 MHz - 1 610 MHz)

Frequency(MHz) : 1 611.25

Channel : A

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	1 604.88	H	6.08	9.53	-51.55	-55.00	-50.00	5.00
	1 609.49	H	6.06	9.55	-15.41	-18.90	3.90	22.80

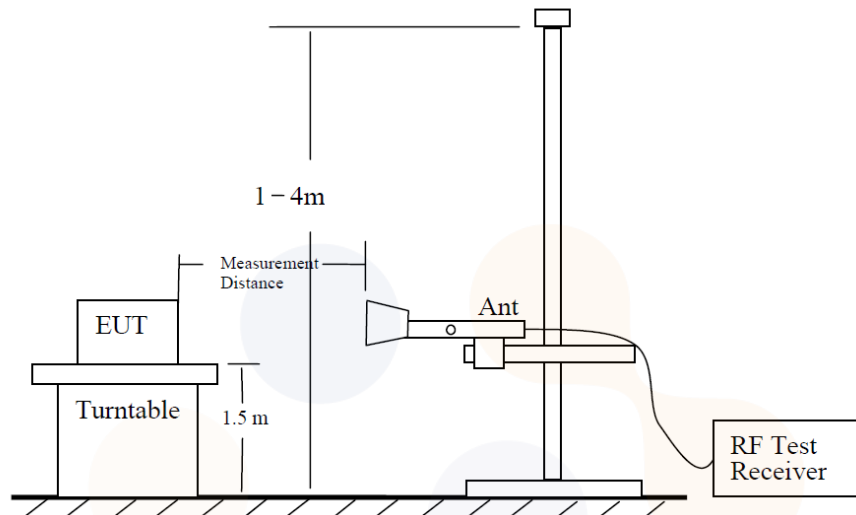
Note.

1. $E.I.R.P(dBm) = \text{Substitute Level}(dB) + \text{Antenna gain}(dBi) - C.L(\text{Cable loss})(dB)$

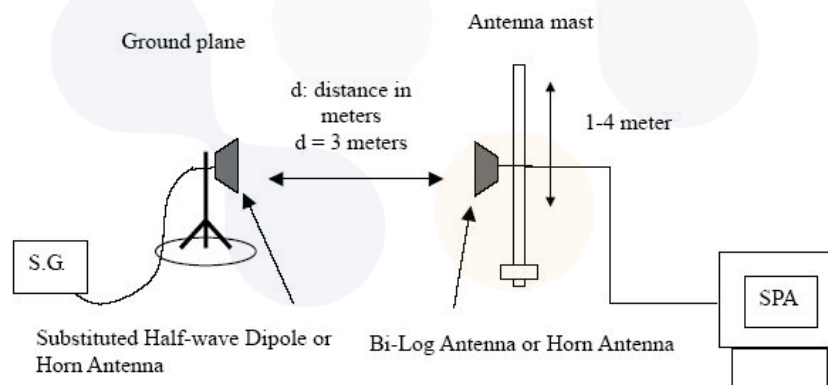
5.8. Carrier-off state emissions (1559 ~ 1610 MHz)

Test setup

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



The diagram below shows the test setup for substituted method.



Limit

According to §25.216(i),

The e.i.r.p density of carrier-off state emissions from mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03-283 with assigned uplink frequencies between 1 and 3 GHz shall not exceed -80 dB W/MHz in the 1559-1610 MHz band averaged over any two millisecond interval.

According to RSS-170(5.10),

MESs with transmitting frequencies between 1 GHz and 3 GHz shall not exceed -80 dBW/MHz, which is the e.i.r.p. density of carrier-off state emissions in the band 1559 – 1610 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 = 1 MHz
- 2) VBW $\geq 3 \times$ RBW.
- 3) Span = 1559 – 1610 MHz
- 4) Detector = RMS
- 5) Trace mode = Max hold
- 6) Allow trace to fully stabilize.

Notes:

1. On a test site, the EUT shall be placed at 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 horn antenna (1 GHz 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.
11. Both horizontal / vertical polarizations and Low/Mid/High channels were investigated.
Low channel was found to be worst case.

Test results

Test mode : Satellite (Carrier-off 1 559 MHz - 1 610 MHz)

Frequency(MHz) : 1 611.25

Channel : A

Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[MHz]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
BPSK	1 582.82	V	5.52	8.43	-53.39	-56.30	-50.00	6.30

Note.

1. $E.I.R.P(dBm) = \text{Substitute Level}(dB) + \text{Antenna gain}(dBi) - C.L(\text{Cable loss}) (dB)$



6. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100732	26.07.01
Spectrum Analyzer	R&S	FSVA3030	101126	26.11.21
PXA Spectrum Analyzer	KEYSIGHT	N9040B	US56050101	26.09.29
Signal Generator	R&S	SMB100A	176206	27.01.15
DC Power Supply	TOYOTECH	TL305TP	20100121	26.06.30
Temp & Hummid Chamber	Myeongseong R&P	CTHC-50P-DT	20150824-2	27.01.15
Attenuator	Weinschel Associates	WA88-30-1414	SN1	26.09.29
Bi-log Antenna	ETS-LINDGREN	3143B	228420	27.07.03
Bi-log Antenna	Teseq GmbH	CBL 6112D	62027	26.10.17
Horn Antenna	ETS-LINDGREN	3117	246058	27.01.23
Horn Antenna	ETS-LINDGREN	3117	251528	27.01.23
High pass Filter	Wainwright Instruments GmbH	WHKX3.0/18G-12SS	44	27.01.16
Amplifier	SONOMA INSTRUMENT	310N	421822	26.09.29
Amplifier	C&K Technologies, Inc.	BZR-00504000-551028-252525	27736	26.04.30

End of test report