2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

BRS and EBS: 2496-2690MHz

§ 27.53 Emission limits

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(2) For digital base stations, the attenuation shall be not less than 43 +10 log (P) dB,unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline,then the following additional attenuation requirements shall apply:

(i) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located 1.5 km or more away, within 24 hours of the receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block and shall immediately notify the complaining licensee upon implementation of the additional attenuation. No later than 60 days after the implementation of such additional attenuation, the licensee of the complaining base station must attenuate its base station emissions by at least 67 +10 log(P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(ii) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located less than 1.5 km away, within 24 hours of receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 +10 log (P)−20 log (Dkm/1.5) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the complaining licensee, or if both base stations are co-located, limit its undesired signal level at the pre-existing base station receiver(s) to no more than −107 dBm measured in a 5.5 megahertz bandwidth and shall immediately notify the complaining licensee upon such reduction in the undesired signal level. No later than 60 days after such reduction in the undesired signal level, the complaining licensee must attenuate its base station emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(iii) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located 1.5 km or more away, within 60 days of receipt of a documented interference complaint the licensee of each base station must attenuate its base station emissions by at least 67 +10

log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the other licensee.

(iv) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located less than 1.5 km away, within 60 days of receipt of a documented interference complaint: (a) The licensee of the new or modified base station must attenuate its OOBE by at least 67 +10 log (P)−20 log (Dkm/1.5) measured 3 megahertz above or below, from the channel edge of its frequency block of the other licensee, or if the base stations are co-located, limit its undesired signal level at the other base station receiver(s) to no more than −107 dBm measured in a 5.5-megahertz bandwidth; and (b) the licensee causing the interference must attenuate its emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(v) For all fixed digital user stations, the attenuation factor shall be not less than 43 +10 log (P) dB at the channel edge

(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P)dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55+ 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Test Method: FCC part 2.1051

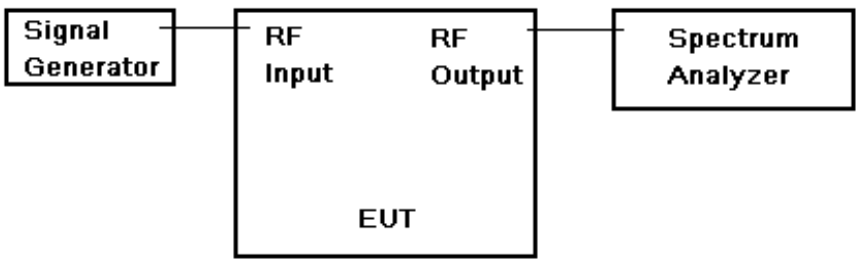
EUT Operation:

Status: Drive the EUT to maximum output power. Pretest was performed in both channels, only kept the final measurement data of worse case.

Conditions: Normal conditions

Application: Cellular Band RF output ports

Test Configuration:



Conducted Spurious Emissions test configuration

Test Procedure:

Conducted Emissions test procedure:

a) Connect the equipment as illustrated, with the notch filter by-passed, when the output power is over the max value of the Spectrum Analyzer, add the attenuator to avoid destroying the facility.

b) Set the center frequency of the spectrum analyzer to the assigned transmitter frequency, key the transmitter, and set the level of the carrier to the full scale reference line.

c) do not apply any tone to modulate the EUT.

d) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth,(base the standard, apply the different set),her is 100KHz for frequency band less than 1GHz, 1MHz for frequency over 1GHz;

2) Video Bandwidth refer to standard requirement.

e) Adjust the center frequency of the spectrum analyzer for incremental coverage of the range from:

1) the lowest radio frequency generated in the equipment, it can be 9KHz base the test method, here select 30MHz as lowest frequency start point;

2) the highest radion frequency shall higher than 10 times of carrier frequency;

f) Record the frequencies and levels of spurious emissions from step e)

Remark:

The notch filter is used for avoid the EUT fundamental carrier output power making the spectrum overload and the harmonic spurious brought by it.

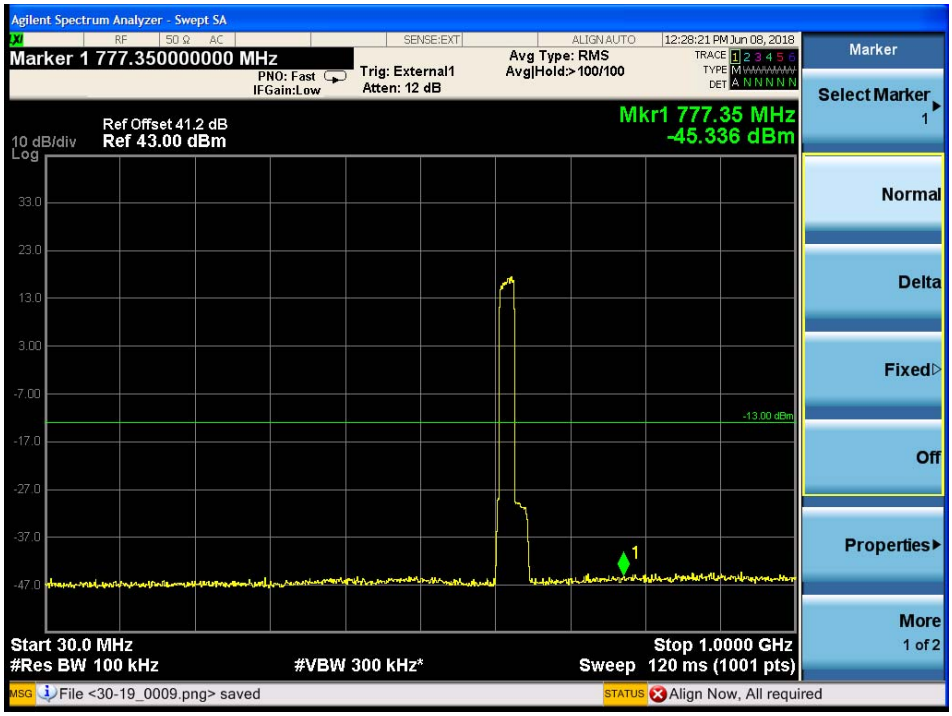
When the EUT fundamental carrier is not enough to make the status, the notch filter could be not used.

7.2.6.1 Measurement Record:

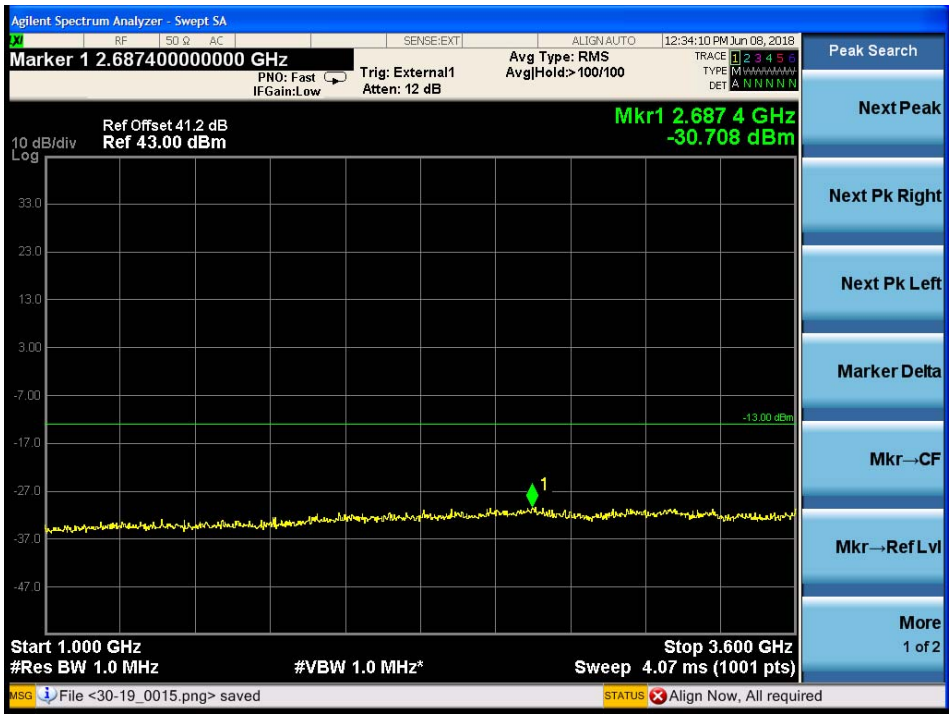
1 Downlink: 617MHz ~ 652MHz

1) Lowest frequency

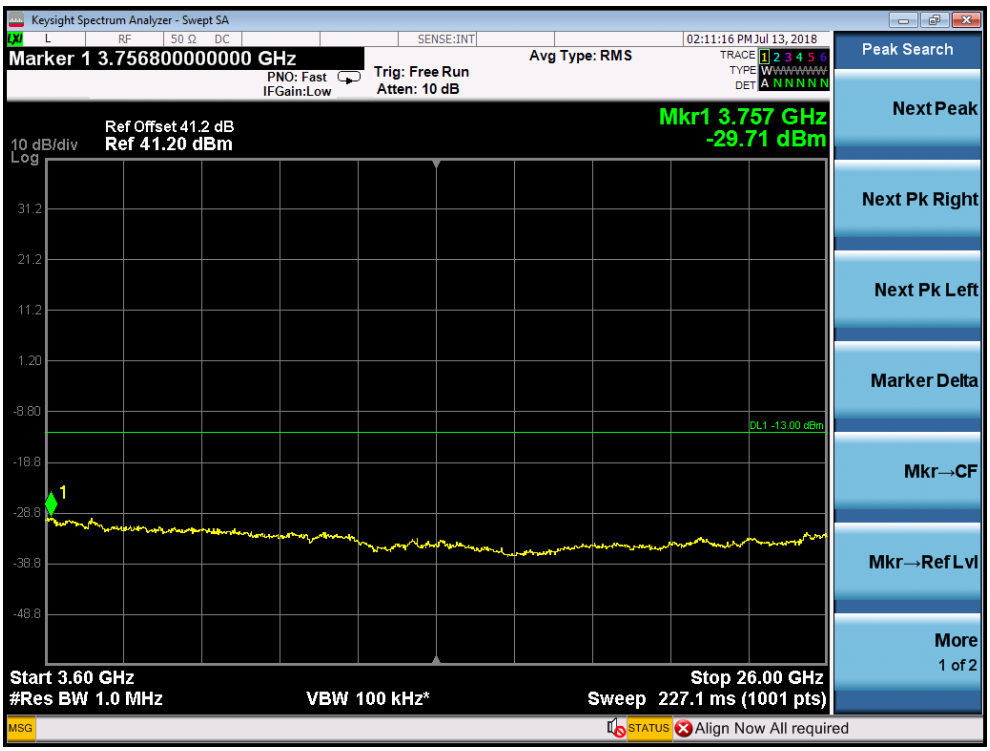
9KHz to 1GHz



1GHz to 3.6GHz

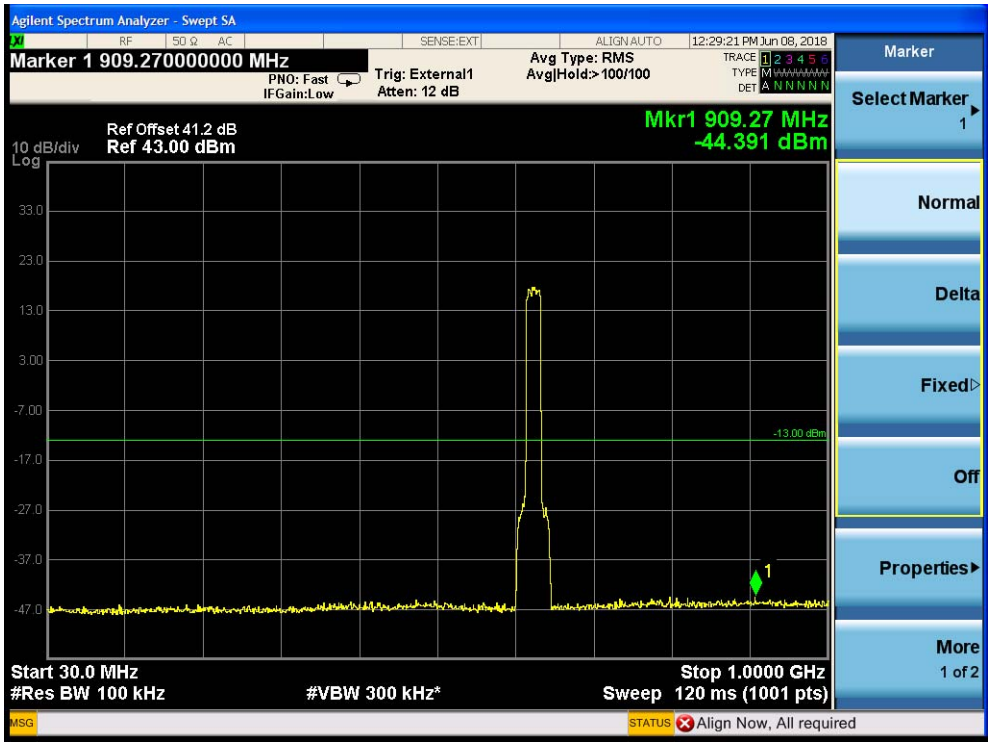


3.6GHz to 26GHz

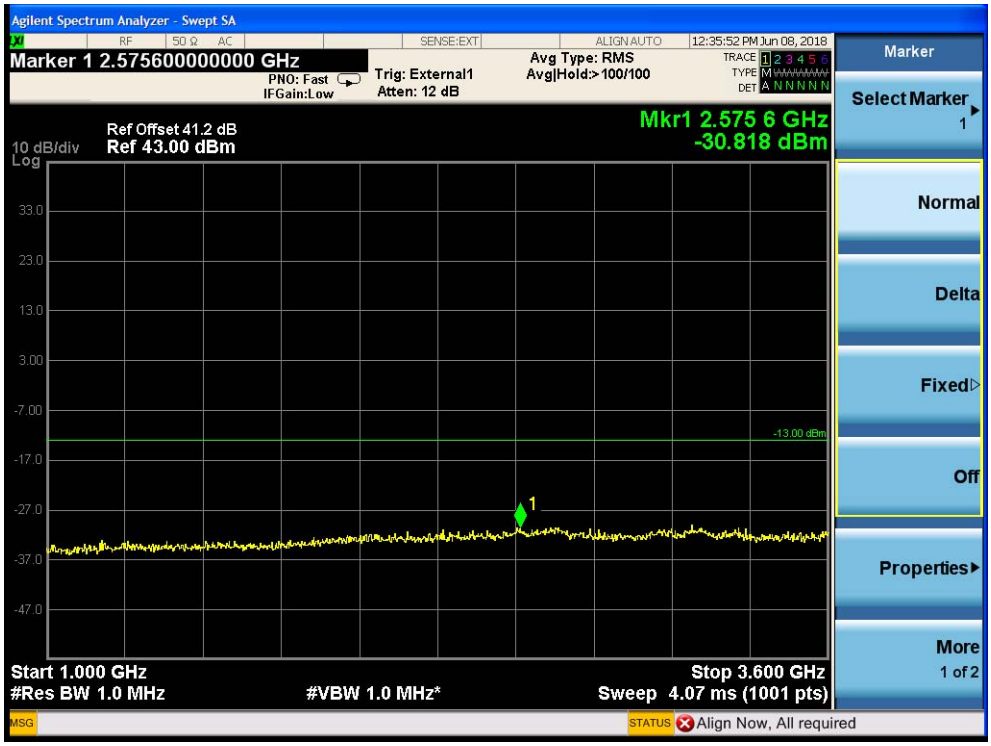


1) Middle frequency

9KHz to 1GHz



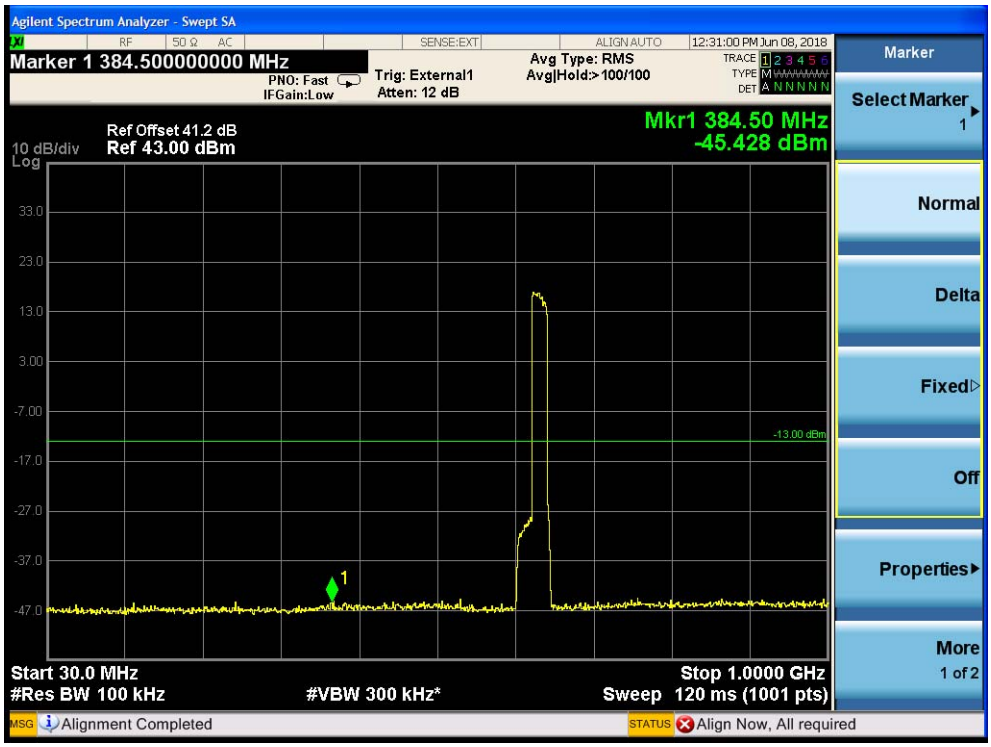
1GHz to 3.6GHz



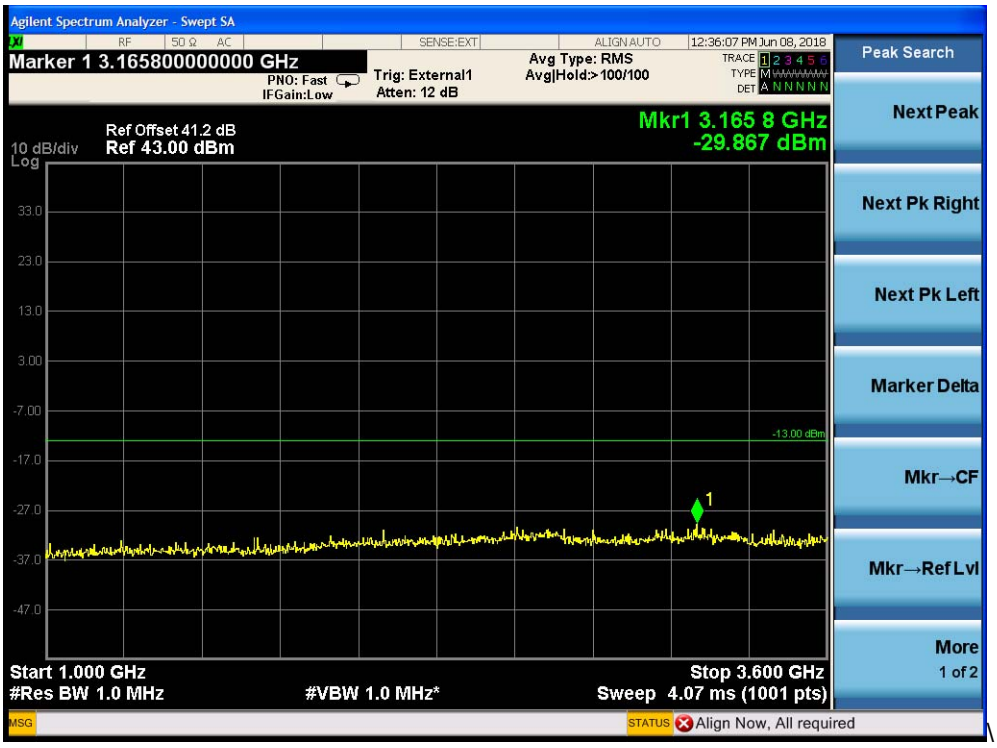
3.6GHz to 26GHz

1) Highest frequency

9KHz to 1GHz



1GHz to 8GHz

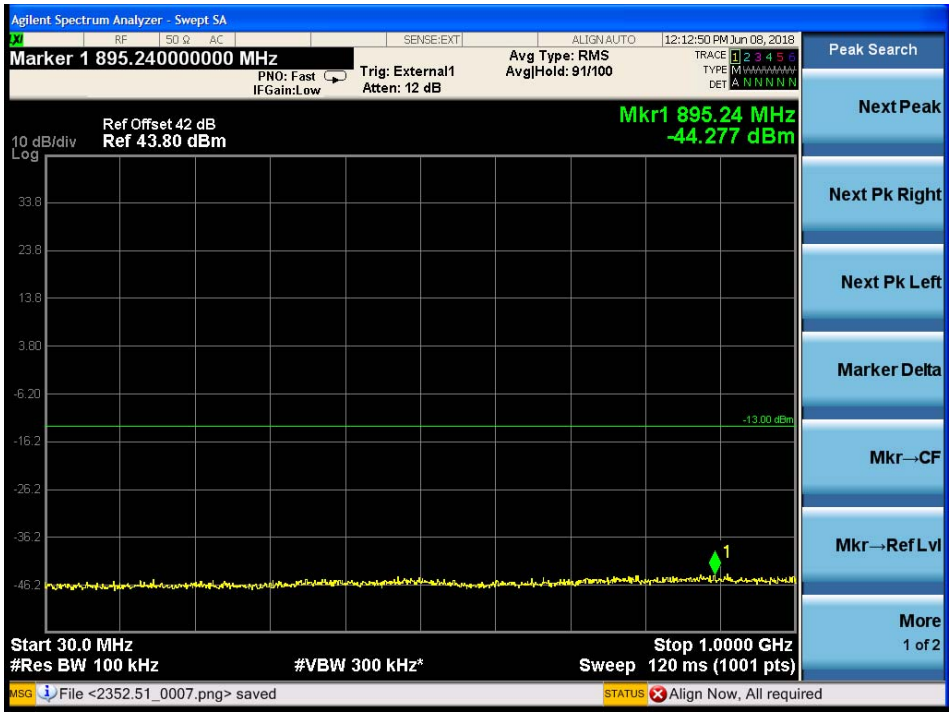


3.6GHz to 26GHz

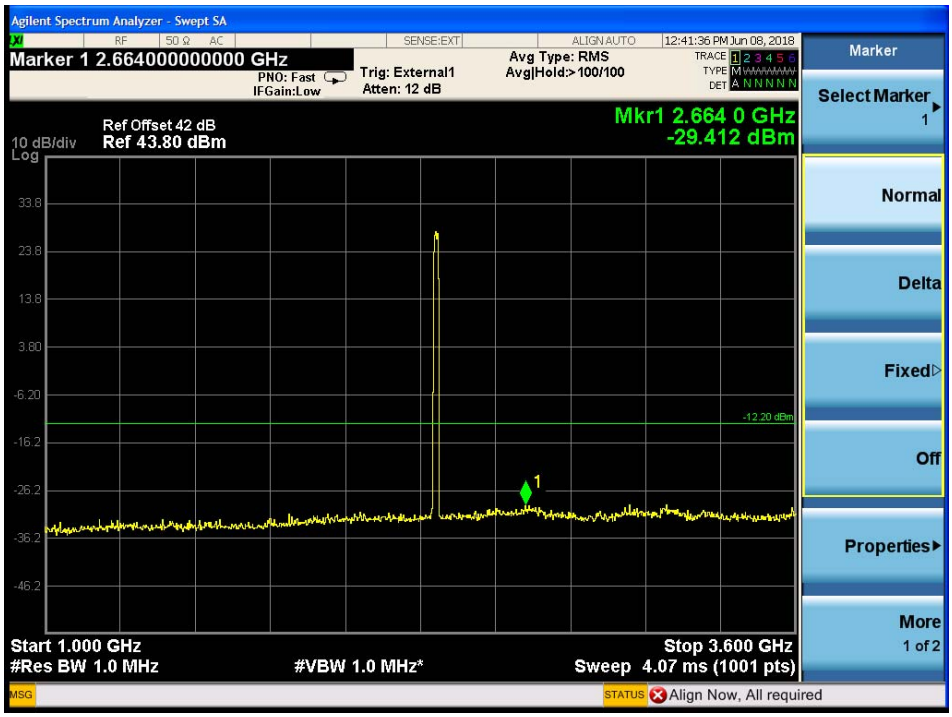
2.Downlink: 2350MHz ~ 2360MHz

1) Middle frequency

9KHz to 1GHz



1GHz to 3.6GHz

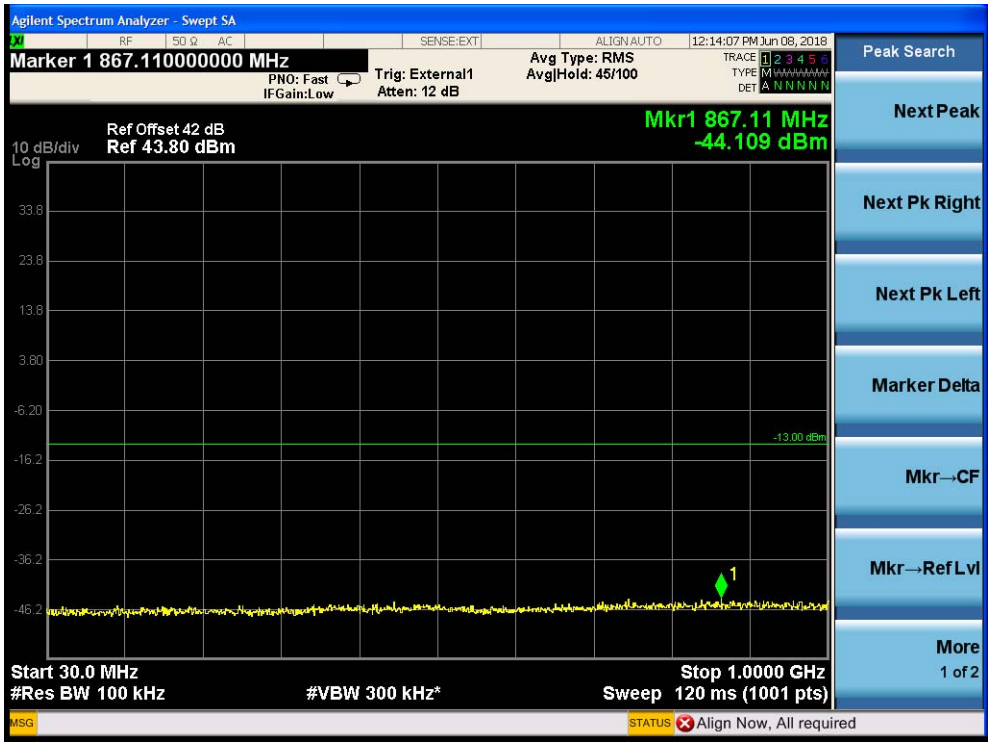


3.6GHz to 26GHz

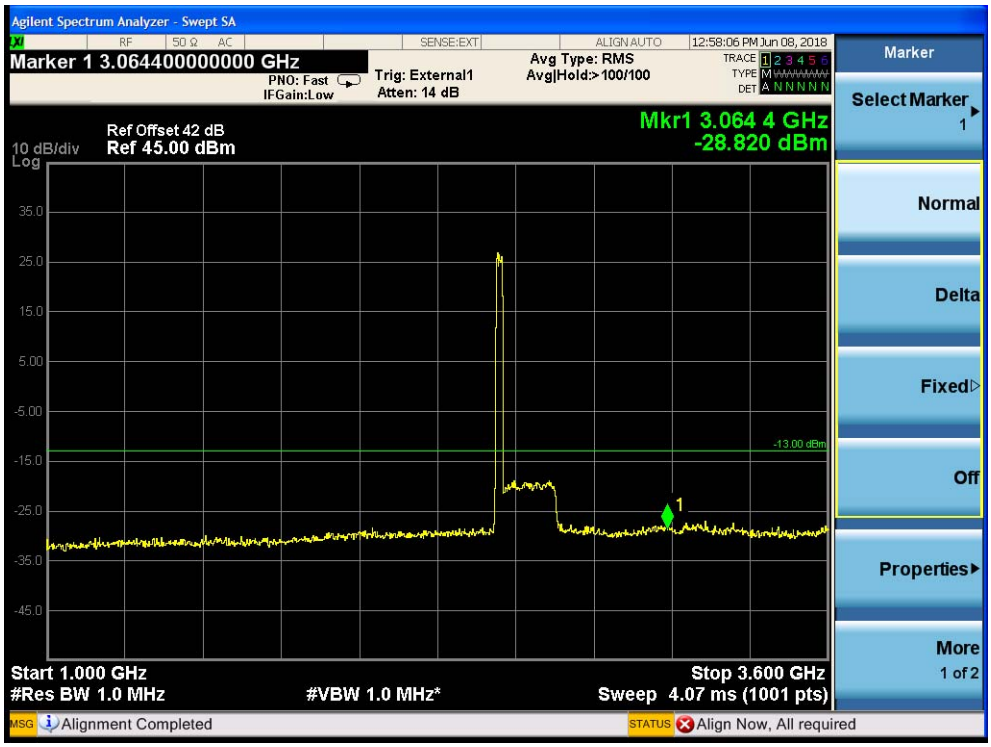
3.Downlink: 2496MHz ~ 2690MHz

1)lowest frequency

9KHz to 1GHz



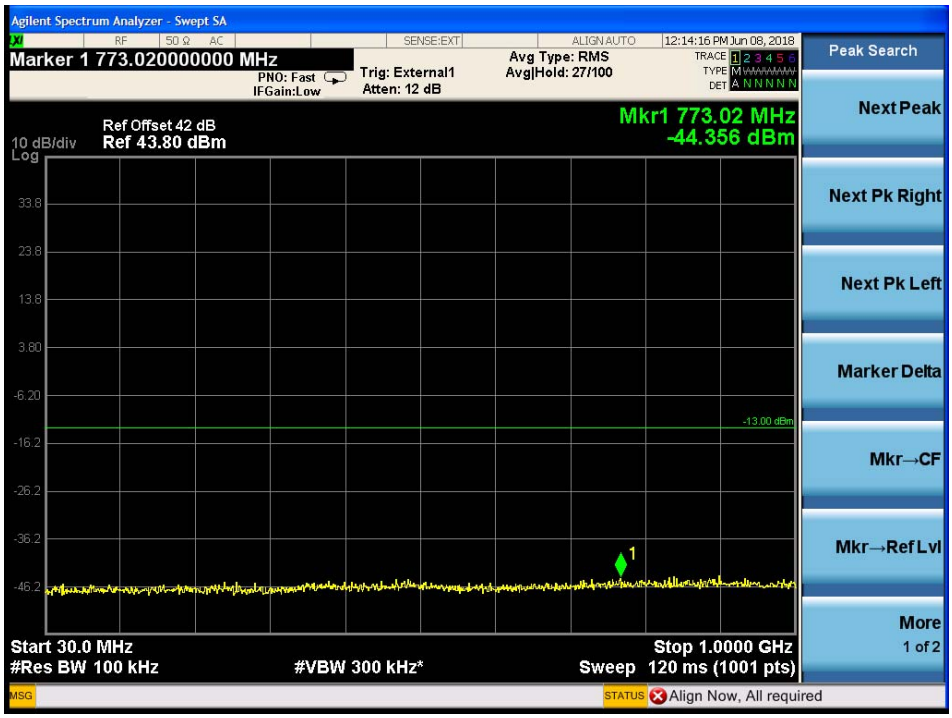
1GHz to 3.6GHz



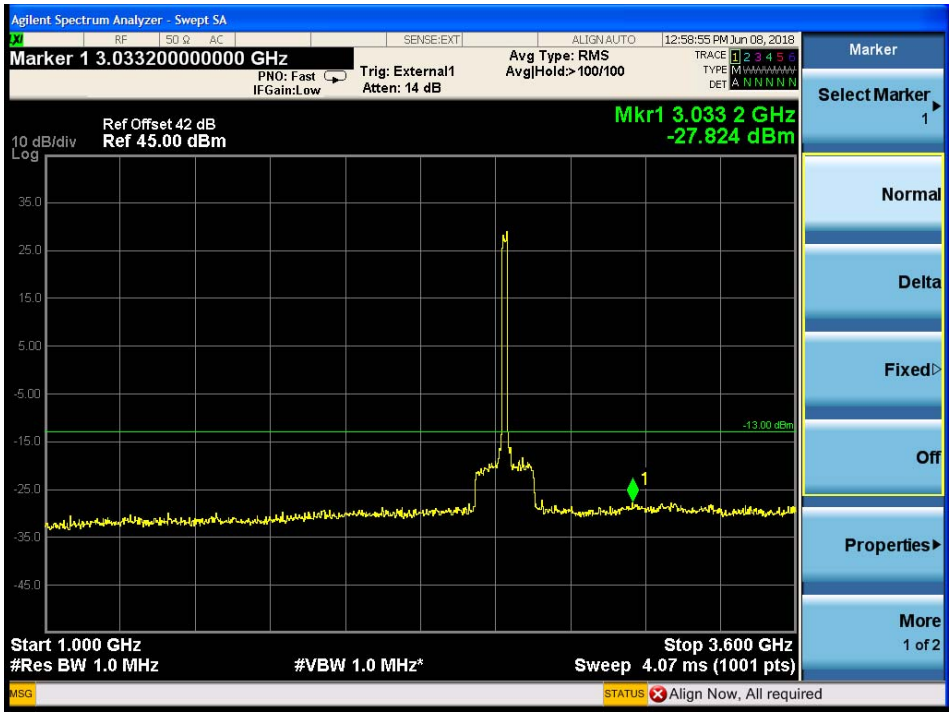
3.6GHz to 26GHz

2)Middle frequency

9KHz to 1GHz



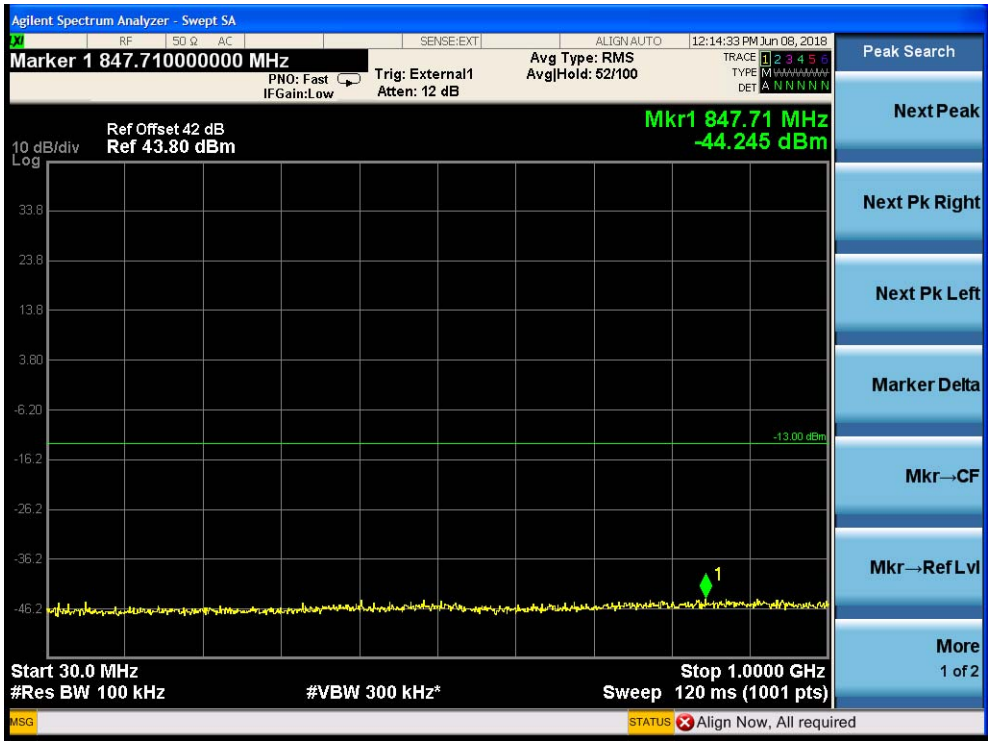
1GHz to 3.6GHz



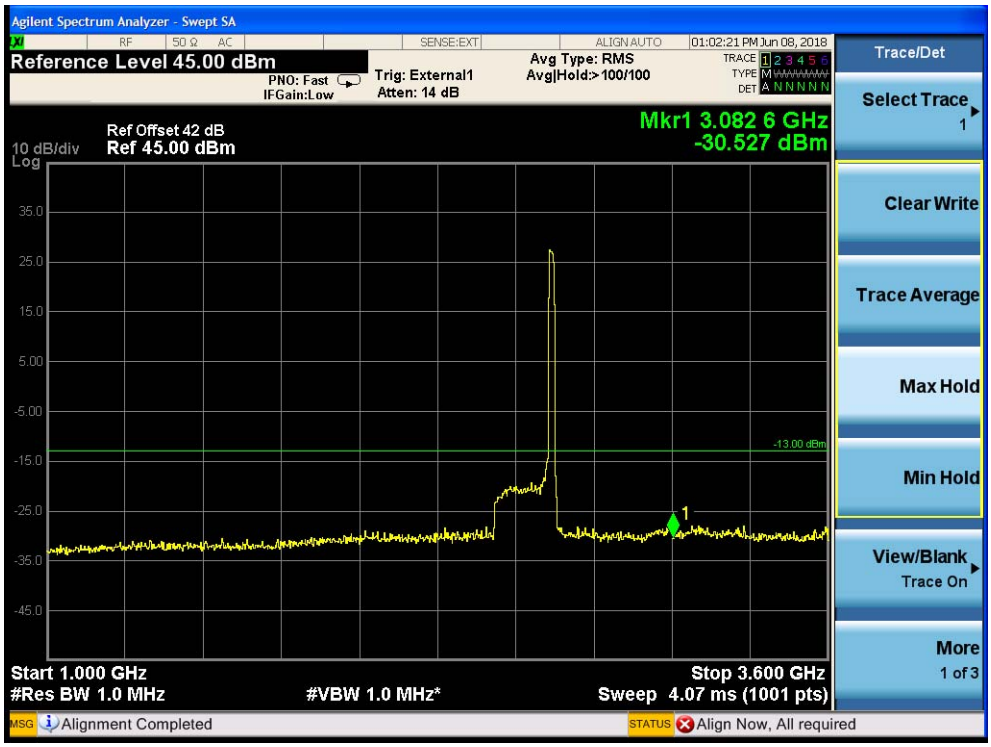
3.6GHz to 26GHz

3)highest frequency

9KHz to 1GHz



1GHz to 3.6GHz



3.6GHz to 26GHz

7.2.7 Frequency Stability

Test Requirement: FCC part 27.54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Method: FCC part 2.1055

EUT Operation:

Status: Drive the EUT to maximum output power.

Conditions: Temperature conditions, voltage conditions

Application: Cellular Band RF output ports

Test Procedure:

1. Temperature conditions:
   a) The RF output port of the EUT was connected to Frequency Meter;
   b) Set the working Frequency in the middle channel;
   c) record the 20°C and norminal voltage frequency value as reference point;
   d) (1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
   e) when reach a temperature point, keep the temperature banlance at least 1 hour to make the product working in this status;
   f) read the frequency at the relative temperature.

2. Voltage conditions:
   a) record the 20°C and norminal voltage frequency value as reference point;
   b) vary the voltage from -15% norminal voltage to +15% voltage;
   c) read the frequency at the relative voltage.

7.2.7.1 Measurement Record:

1) Frequency Stability vs temperature:

1.1) Test for Downlink: 617~652MHz (middle channel 634.5MHz Modulation)

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
50	634.5000018	0.00047281
40	634.5000020	0.00078802
30	634.5000016	0.00015760
20	634.5000015	Reference
10	634.5000021	0.00094563
0	634.5000015	0
-10	634.5000019	0.00063042
-20	634.5000017	0.00031521
-30	634.5000021	0

1.2) Test for Downlink: 2350~2360MHz (middle channel 2355MHz Modulation)

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
50	2355.0000018	-0.00004246
40	2355.0000022	0.00012739
30	2355.0000016	-0.00012739
20	2355.0000019	Reference
10	2355.0000021	0.00008493
0	2355.0000017	-0.00008493
-10	2355.0000021	0.00008493
-20	2355.0000015	-0.00016985
-30	2355.0000023	0.00016985

1.3) Test for Downlink: 2496~2690MHz (middle channel 2593MHz)

Temperature(°C)	Frequency(MHz)	Tolerance(ppm)
50	2593.0000015	-0.00011570
40	2593.0000017	-0.00003857
30	2593.0000016	-0.00007713
20	2593.0000018	Reference
10	2593.0000020	0.00007713
0	2593.0000021	0.00011570
-10	2593.0000019	0.00003857
-20	2593.0000017	-0.00003857
-30	2593.0000022	0.00015426

2) Frequency Stability vs voltage:

2.1) **For AC supplied:**

2.1.1) Test for Downlink: 617~652MHz (middle channel 634.5MHz)

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	634.5000021	0.00004246
120	634.5000019	Reference
138 (120*1.15)	634.5000018	0.00008493

2.1.2) Test for Downlink: 2350~2360MHz (middle channel 2355MHz)

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	2355.0000022	0.00008493
120	2355.0000020	Reference
138 (120*1.15)	2355.0000019	-0.00004246

2.1.3) Test for Downlink: 2496~2690MHz (middle channel 2593MHz)

Voltage(V AC)	Frequency(MHz)	Tolerance(ppm)
102 (120*0.85)	2593.0000021	0.00011570
120	2593.0000018	Reference
138 (120*1.15)	2593.0000019	0.00003857

7.2.8 Radiated Spurious Emissions

Test Requirement: FCC part 27.53(a) **&** FCC part 27.53(m)(v) **&** FCC part 27.53(g)

WCS:2350-2360MHz: 600MHz: 617-652MHz

§27.53 Emission limits.

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:
(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:
(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;
(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz; .

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

(2) For fixed customer premises equipment (CPE) stations operating in the 2305-2320 MHz band and the 2345-2360 MHz band transmitting with more than 2 watts per 5 megahertz average EIRP:
(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and

2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

BRS and EBS: 2496-2690MHz

(v) For all fixed digital user stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge.

Test Method: FCC part 2.1053

TIA 603-E-2016

EUT Operation:

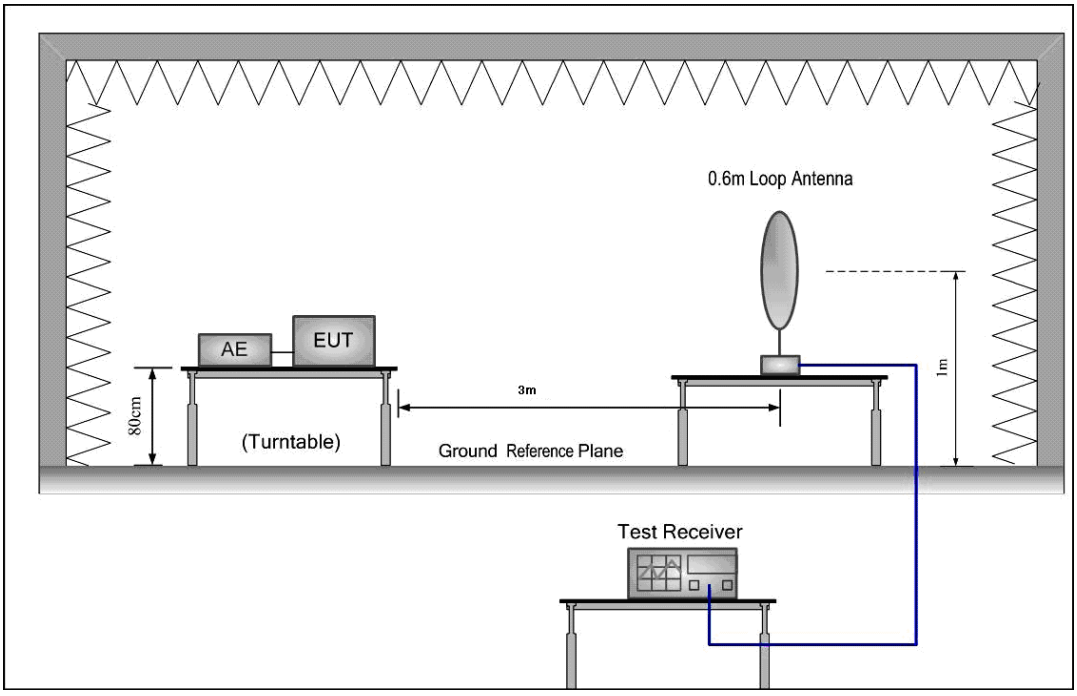
Status: Drive the EUT to maximum output power of both channels.

Conditions: Normal conditions

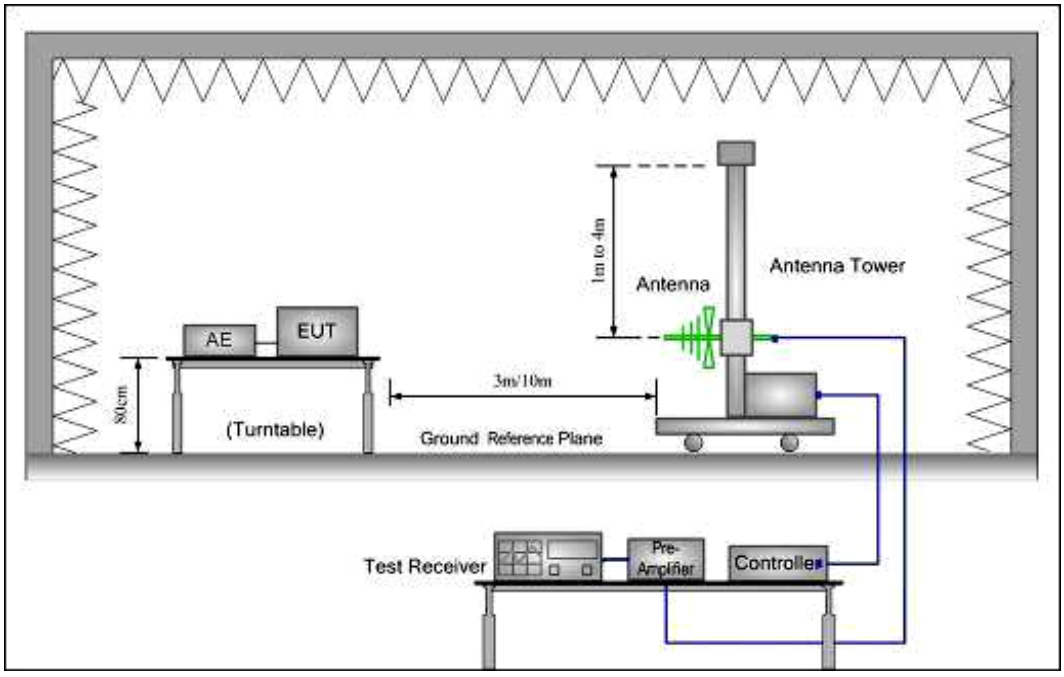
Application: Enclosure

Test Configuration:

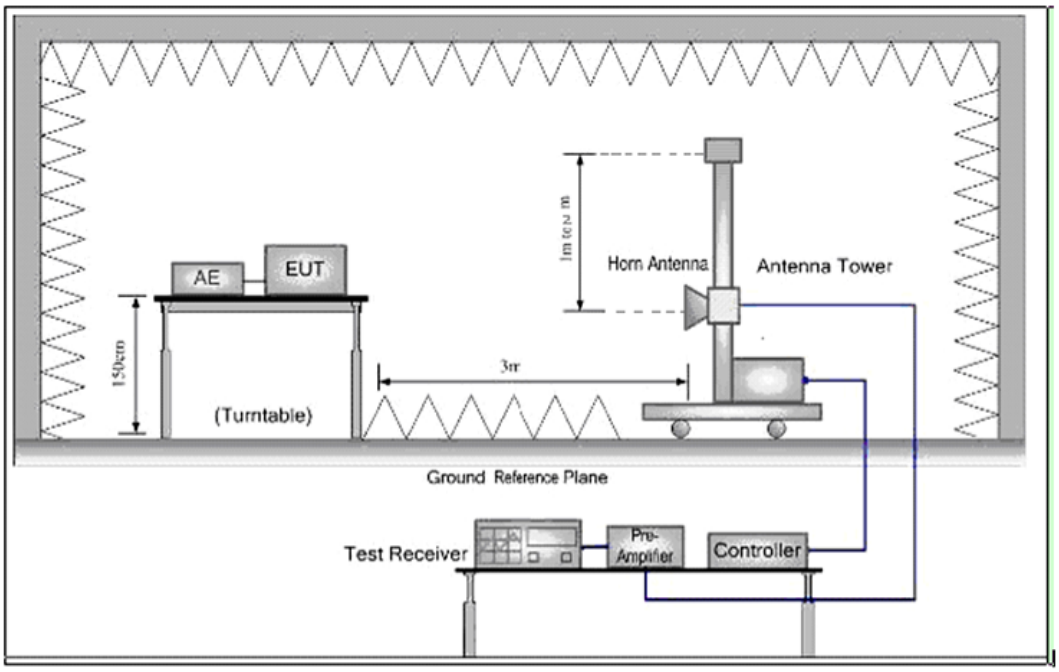
9 kHz to 30 MHz emissions:



30MHz to 1GHz emissions:



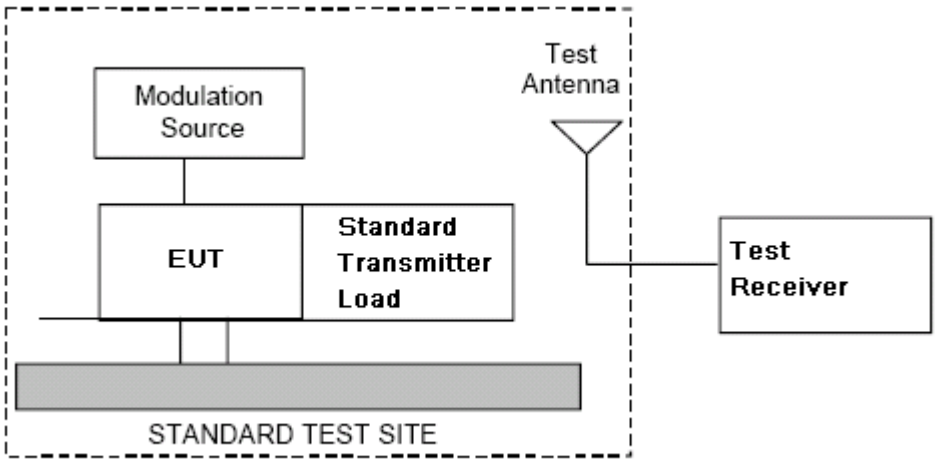
1GHz to 40GHz emissions:



Test Procedure:

1. Test the background noise level with all the test facilities;
2. Keep one transmitting path, all other connectors shall be connected by normal power or RF leads;
3. Select the suitable RF notch filter to avoid the test receiver or spectrum analyzer produce unwanted spurious emissions;
4. Keep the EUT continuously transmitting in max power;
5. Read the radiated emissioins of the EUT enclosure.

Radiated Emissions Test Procedure:



a) Connect the equipment as illustrated.

b) Adjust the spectrum analyzer for the following settings:

1) Resolution Bandwidth = 100 kHz for spurious emissions below 1 GHz, and 1 MHz for spurious emissions above 1GHz.

2) Video Bandwidth = 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

3) Sweep Speed slow enough to maintain measurement calibration.

4) Detector Mode = Positive Peak.

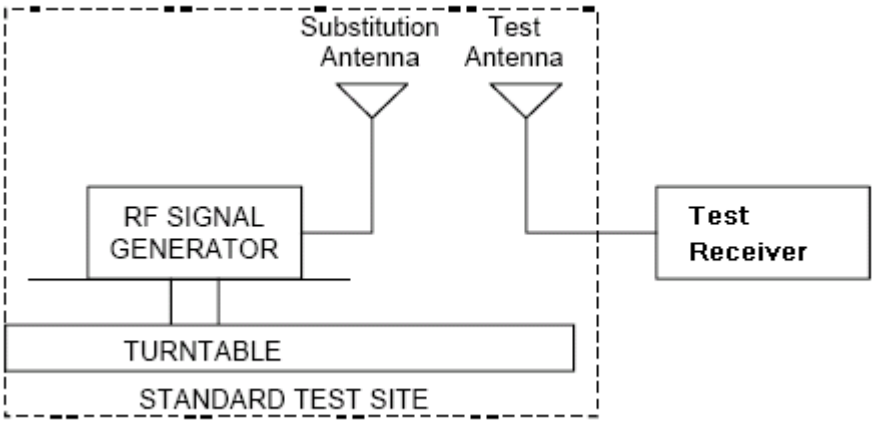
c) Place the transmitter to be tested on the turntable in the standard test site, The transmitter is transmitting into a nonradiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

d) Measurements shall be made from30MHz to 10 tims of fundamental carrier, except for the region close to the carrier equal to ± the carrier bandwidth.

e) Key the transmitter without modulation or normal modulation base the standard.

f) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Then the turntable should be rotated 360° to determine the maximum reading. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

g) Repeat step f) for each spurious frequency with the test antenna polarized vertically.



h) Reconnect the equipment as illustrated.

i) Keep the spectrum analyzer adjusted as in step b).

j) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At the lower frequencies, where

the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

k) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to

obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

l) Repeat step k) with both antennas vertically polarized for each spurious frequency.

m) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps k) and l) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole

antenna by the following formula:

Pd(dBm) = *Pg*(dBm) – *cable loss* (dB) + *antenna gain* (dB)

where:

Pd is the dipole equivalent power and

Pg is the generator output power into the substitution antenna.

NOTE: It is permissible to use other antennas provided they can be referenced to a dipole.

NOTE: Effective radiated power (e.r.p) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p.
e.r.p (dBm) = e.i.r.p. (dBm) – 2.15

7.2.8.1 Measurement Record:

No emissions were detected within 20dB below the limit for the Downlink direction.

Test Result:

9K**Hz~1000 MHz Field Strength of Unwanted Emissions. Peak Measurement**

9KHz~1000 MHz Field Strength of Unwanted Emissions. Peak Measurement

The measurements with Loop and Log antennas were greater than 20dB below the limit, so the test data were only recorded one worst mode test graph in the test report.

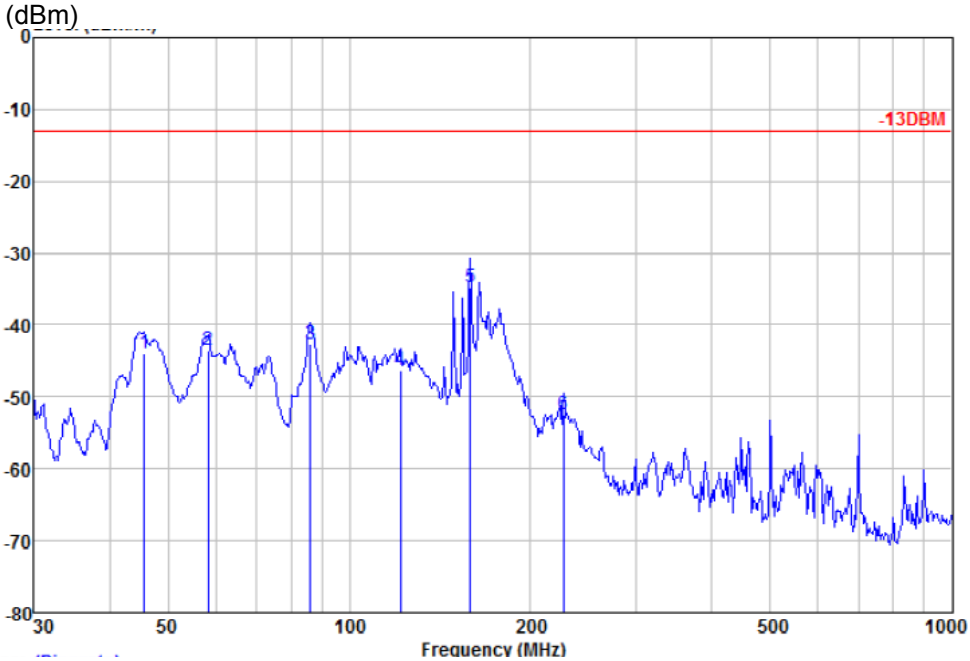
Test at Frequency (2593MHz) in transmitting status

30 MHz~1 GHz Spurious Emissions .Peak Measurement

Vertical:

Peak scan

Level (dBm)



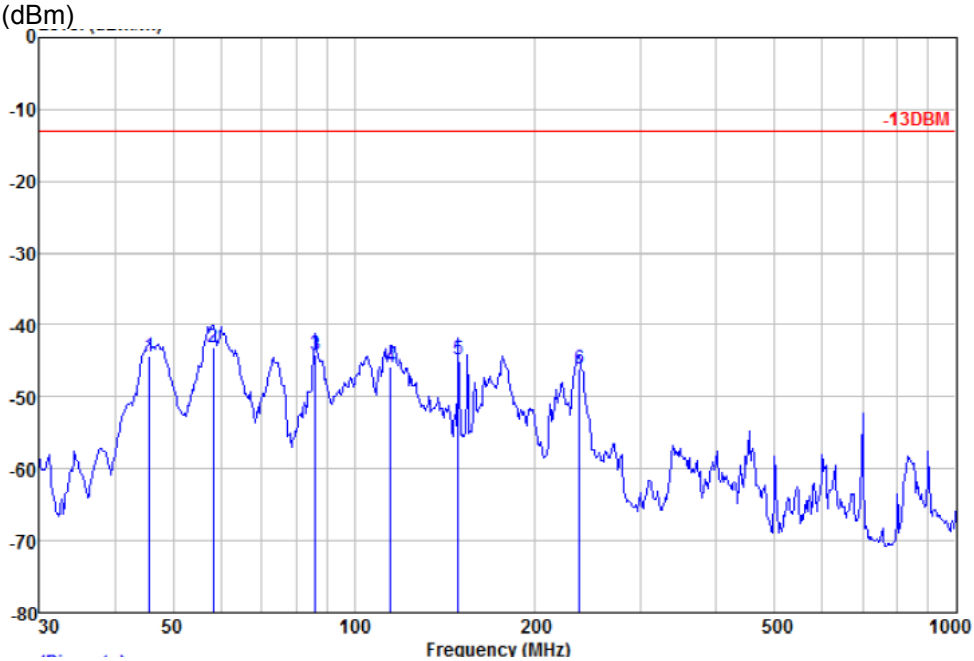
Peak measurement

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	45.695	-50.50	33.55	0.00	27.00	-43.95	-12.99	-30.96
2	58.407	-44.60	28.11	0.00	27.00	-43.49	-12.99	-30.50
3	86.200	-46.54	30.85	0.00	26.97	-42.66	-12.99	-29.67
4	121.549	-60.26	40.88	0.00	26.90	-46.28	-12.99	-33.29
5	158.668	-51.97	43.92	0.00	26.74	-34.79	-12.99	-21.80
6	226.894	-61.03	34.93	0.00	26.47	-52.57	-12.99	-39.58

Horizontal:

Peak scan

Level (dBm)



Peak measurement

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit
	MHz	dBm	dB/m	dB	dB	dBm/m	dBm/m	dB
1	45.695	-59.85	42.42	0.00	27.00	-44.43	-12.99	-31.44
2	58.407	-47.98	31.96	0.00	27.00	-43.02	-12.99	-30.03
3	86.200	-49.10	31.98	0.00	26.97	-44.09	-12.99	-31.10
4	114.917	-60.42	41.52	0.00	26.90	-45.80	-12.99	-32.81
5	148.963	-57.37	39.43	0.00	26.78	-44.72	-12.99	-31.73
6	236.645	-58.45	38.68	0.00	26.41	-46.18	-12.99	-33.19

Frequency (MHz)	Antenna factors (dB/m)	Preamp factor (dB)	Reading Level (dBm)	Emission Level (dBm/m)	Limit (dBm/m)	Over limit (dB)	Antenna polarization
2980.327	46.68	39.4	-55.94	-48.66	-13.00	-35.66	Vertical
3151.992	47.04	39.58	-47.00	-39.54	-13.00	-26.54	V
5191.168	51.03	40.18	-37.05	-26.2	-13.00	-13.20	V
2980.327	48.26	39.4	-53.31	-44.45	-13.00	-31.45	Horizontal
3151.992	48.61	39.58	-46.81	-37.78	-13.00	-24.78	H
5191.168	53.98	40.18	-37.92	-24.12	-13.00	-11.12	H

Remark:

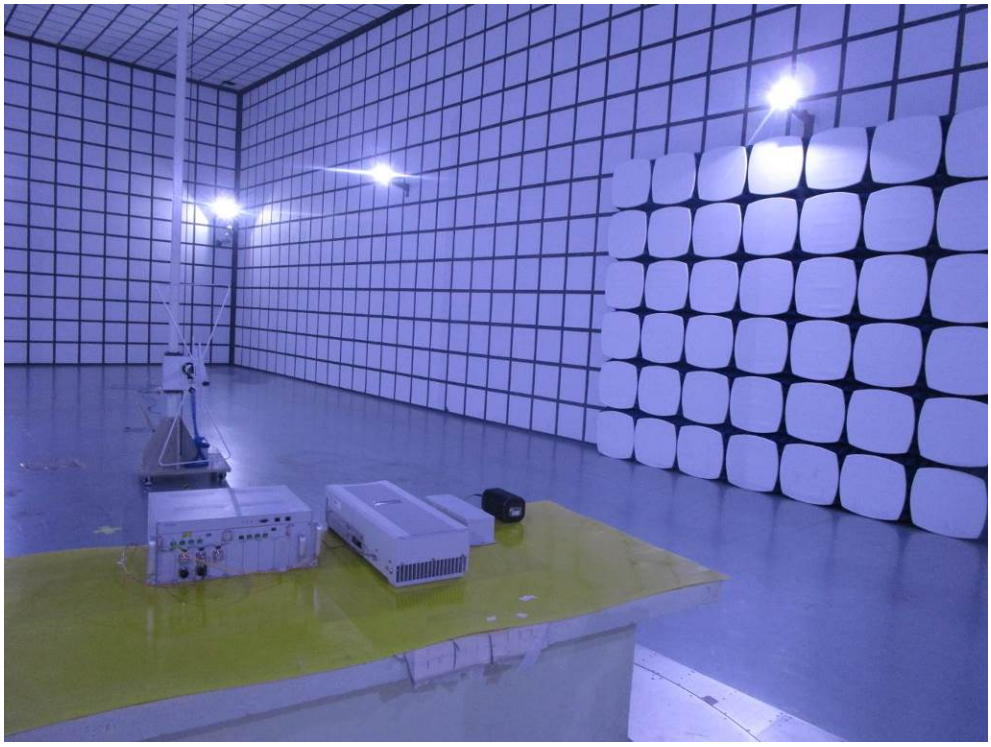
The cabinet radiation was measured with the equipment transmitting a CW signal into a non-radiating 50 Ohm load at maximum output power on a signal frequency .

Measured were performed in the lowest, middle and hightest frequency for the Downlink of products which included AC Unit.

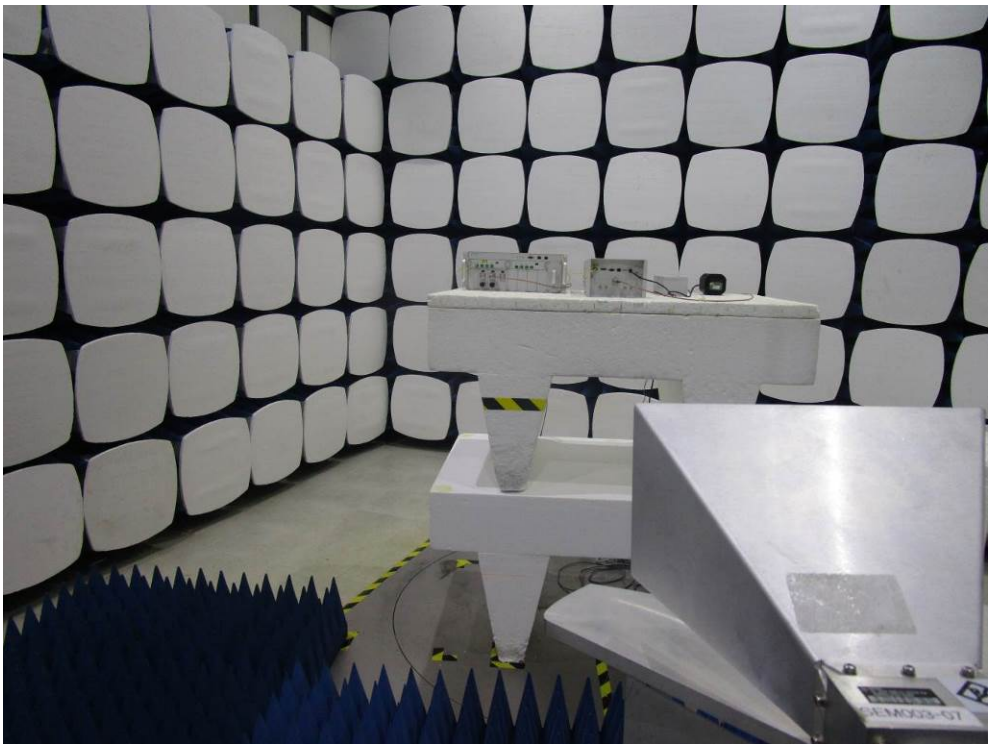
The spectrum was searched from 9KHz to 27GHz (10th Harmonic) for downlink and only record some worse cases.

8 Photographs - Test Setup

30MHz ~ 1GHz Radiated Emission



Above 1GHz Radiated Emission



9 Photographs - EUT Constructional Details

Please refer to Appendix A - Photographs of EUT Constructional Details for GZEM1806003121CR

--The End of Report--