

(2) Uplink transmit mode

Frequency range		Intermodulation product Limit (dBm)	Max. intermodulation product (dBm)	Margin (dB)	Result
With the AGC threshold level					
Channel Bandwidth: 12.5kHz	Low frequency: f1:799.00625MHz f2:799.01875MHz	-13dBm	-30.64	-17.64	pass
	Mid frequency: f1:802.0MHz f2:802.0125MHz	-13dBm	-32.61	-19.61	pass
	High frequency: f1:804.98125MHz f2:804.99375MHz	-13dBm	-34.15	-21.15	pass
Channel Bandwidth: 25kHz	Low frequency: f1:799.0125MHz f2:799.0375MHz	-13dBm	-37.00	-24.00	pass
	Mid frequency: f1:802.0MHz f2:802.025MHz	-13dBm	-36.64	-23.54	pass
	High frequency: f1:804.9625MHz f2:804.9875MHz	-13dBm	-34.55	-21.55	pass
With the input signal amplitude set 3 dB above the ALC threshold					
Channel Bandwidth: 12.5kHz	Low frequency: f1:799.00625MHz f2:799.01875MHz	-13dBm	-32.20	-19.20	pass
	Mid frequency: f1:802.0MHz f2:802.0125MHz	-13dBm	-34.38	-21.38	pass
	High frequency: f1:804.98125MHz f2:804.99375MHz	-13dBm	-34.90	-21.90	pass
Channel Bandwidth: 25kHz	Low frequency: f1:799.0125MHz f2:799.0375MHz	-13dBm	-35.93	-22.93	pass
	Mid frequency: f1:802.0MHz f2:802.025MHz	-13dBm	-36.43	-23.43	pass
	High frequency: f1:804.9625MHz f2:804.9875MHz	-13dBm	-34.90	-21.90	pass
Note: 1*--Margin= Maximum mark level- specification limit.					

6.7.4.2 800MHz Band

(1) Downlink transmit mode

Frequency range		Intermodulaiton product Limit (dBm)	Max. intermodulation product(dBm)	Margin(dB)	Result
With the AGC threshold level					
Channel Bandwidth: 12.5kHz	Low frequency: f1:851.00625MHz f2:851.01875MHz	-13dBm	-13.65	-0.65	pass
	Mid frequency: f1:860.0MHz f2:860.0125MHz	-13dBm	-16.02	-3.02	pass
	High frequency: f1:868.98125MHz f2:868.99375MHz	-13dBm	-16.27	-3.27	pass
Channel Bandwidth: 25kHz	Low frequency: f1:851.0125MHz f2:851.0375MHz	-13dBm	-13.90	-0.90	pass
	Mid frequency: f1:860.0MHz f2:860.025MHz	-13dBm	-15.08	-2.08	pass
	High frequency: f1:868.9625MHz f2:868.9875MHz	-13dBm	-15.22	-2.22	pass
With the input signal amplitude set 3 dB above the ALC threshold					
Channel Bandwidth: 12.5kHz	Low frequency: f1:851.00625MHz f2:851.01875MHz	-13dBm	-13.38	-0.38	pass
	Mid frequency: f1:860.0MHz f2:860.0125MHz	-13dBm	-15.57	-2.57	pass
	High frequency: f1:868.98125MHz f2:868.99375MHz	-13dBm	-16.97	-3.97	pass
Channel Bandwidth: 25kHz	Low frequency: f1:851.0125MHz f2:851.0375MHz	-13dBm	-14.39	-1.39	pass
	Mid frequency: f1:860.0MHz f2:860.025MHz	-13dBm	-15.58	-2.58	pass
	High frequency: f1:868.9625MHz f2:868.9875MHz	-13dBm	-15.21	-2.21	pass
Note: 1*--Margin= Maximum mark level- specification limit.					

(2) Uplink transmit mode

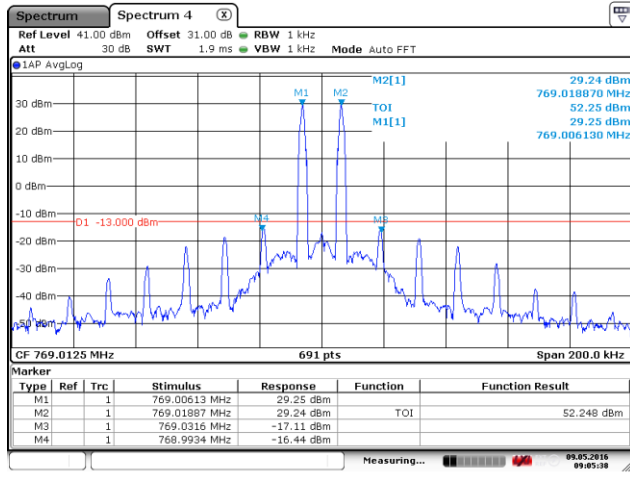
Frequency range		Intermodulation product Limit (dBm)	Max. intermodulation product(dBm)	Margin(dB)	Result
With the AGC threshold level					
Channel Bandwidth: 12.5kHz	Low frequency: f1:806.00625MHz f2:806.01875MHz	-13dBm	-35.73	-22.73	pass
	Mid frequency: f1:815.0MHz f2:815.0125MHz	-13dBm	-36.76	-23.76	pass
	High frequency: f1:823.98125MHz f2:823.99375MHz	-13dBm	-32.96	-19.96	pass
Channel Bandwidth: 25kHz	Low frequency: f1:806.0125MHz f2:806.0375MHz	-13dBm	-33.72	-20.72	pass
	Mid frequency: f1:815.0MHz f2:815.025MHz	-13dBm	-38.86	-25.86	pass
	High frequency: f1:823.9625MHz f2:823.9875MHz	-13dBm	-35.96	-22.96	pass
With the input signal amplitude set 3 dB above the ALC threshold					
Channel Bandwidth: 12.5kHz	Low frequency: f1:806.00625MHz f2:806.01875MHz	-13dBm	-32.46	-19.46	pass
	Mid frequency: f1:815.0MHz f2:815.0125MHz	-13dBm	-33.62	-20.62	pass
	High frequency: f1:823.98125MHz f2:823.99375MHz	-13dBm	-34.97	-21.97	pass
Channel Bandwidth: 25kHz	Low frequency: f1:806.0125MHz f2:806.0375MHz	-13dBm	-33.65	-20.65	pass
	Mid frequency: f1:815.0MHz f2:815.025MHz	-13dBm	-33.39	-20.39	pass
	High frequency: f1:823.9625MHz f2:823.9875MHz	-13dBm	-34.37	-21.37	pass
Note: 1*--Margin= Maximum mark level- specification limit.					

6.7.5 Test screenshot

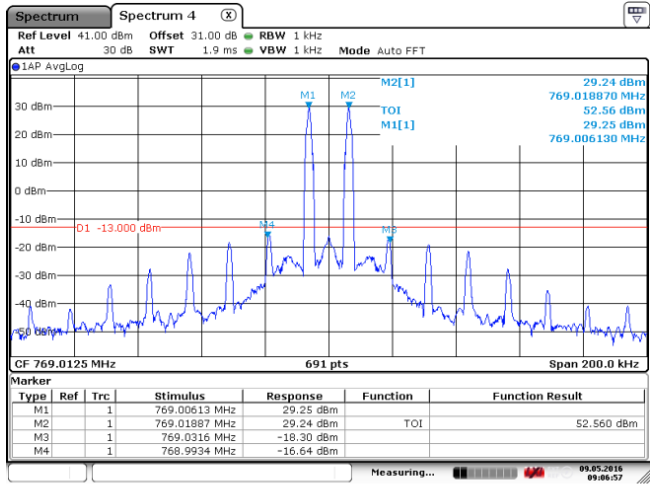
6.7.5.1 700MHz Band

(1) Channel bandwidth 12.5kHz

(1.1) Downlink



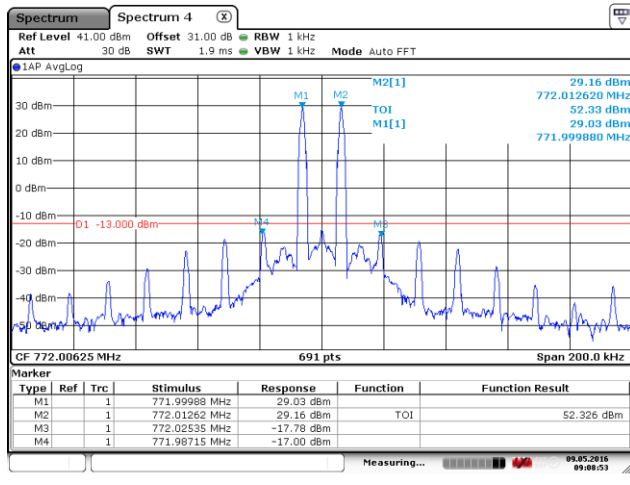
Date: 9.MAY.2016 09:05:19



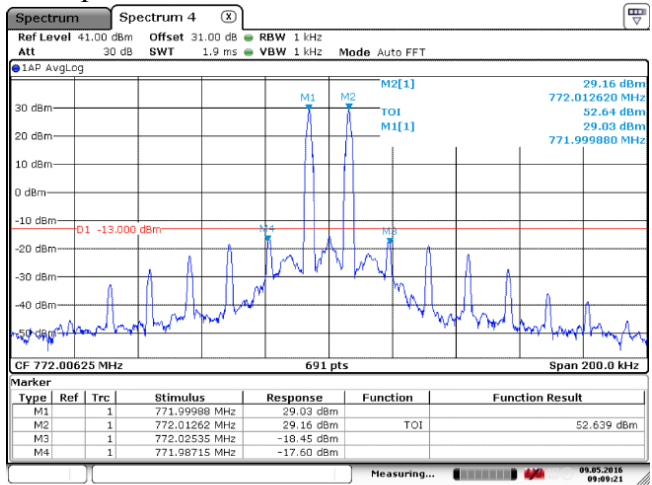
Date: 9.MAY.2016 09:06:57

Low Frequency and With the AGC threshold level

Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



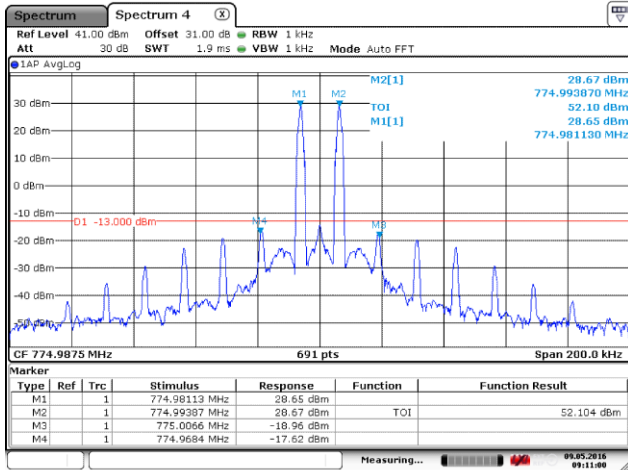
Date: 9.MAY.2016 09:08:54



Date: 9.MAY.2016 09:09:21

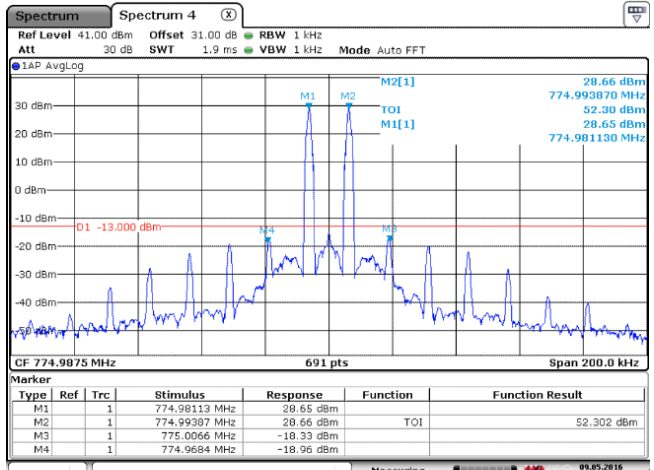
Mid Frequency and With the AGC threshold level

Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold



Date: 9.MAY.2016 09:11:01

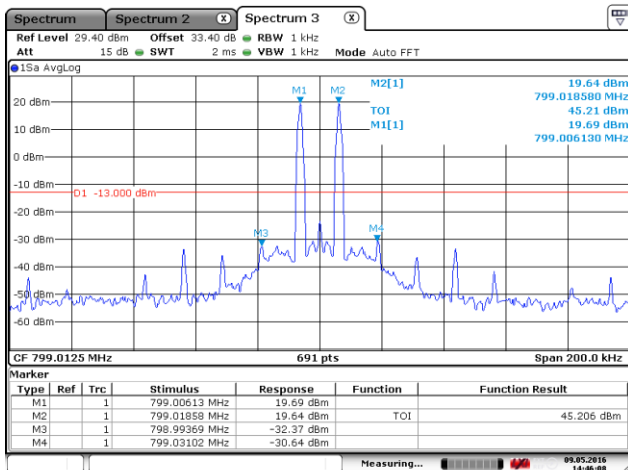
High Frequency and With the AGC threshold level



Date: 9.MAY.2016 09:11:22

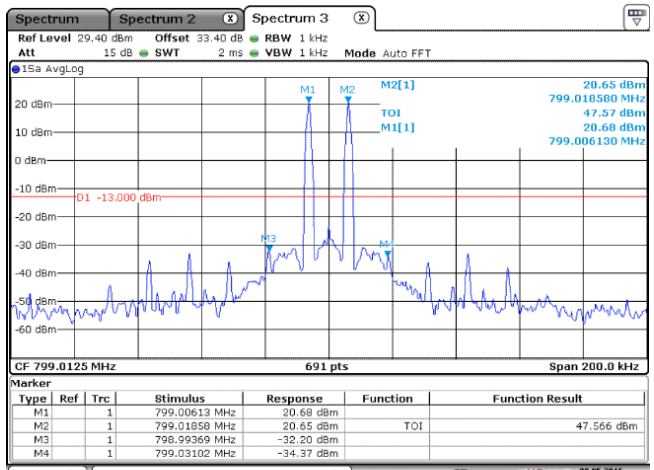
High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

(1.2) Uplink



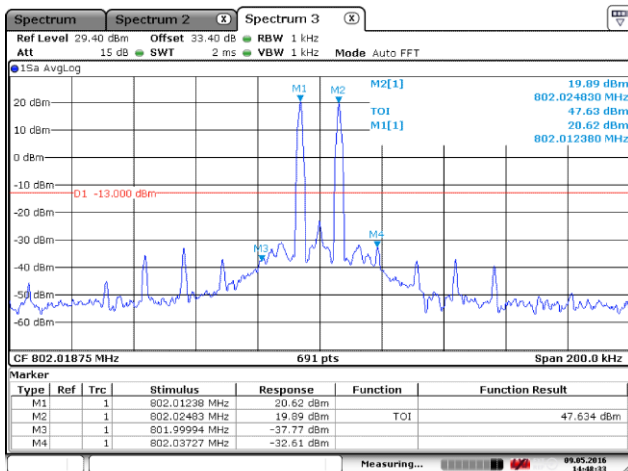
Date: 9.MAY.2016 14:46:08

Low Frequency and With the AGC threshold level



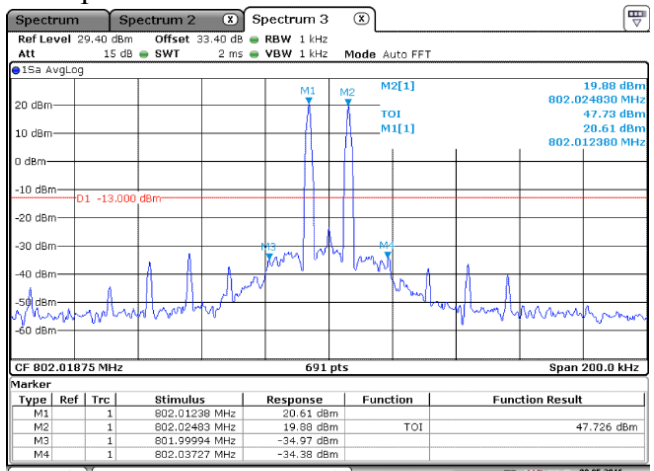
Date: 9.MAY.2016 14:46:36

Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



Date: 9.MAY.2016 14:48:33

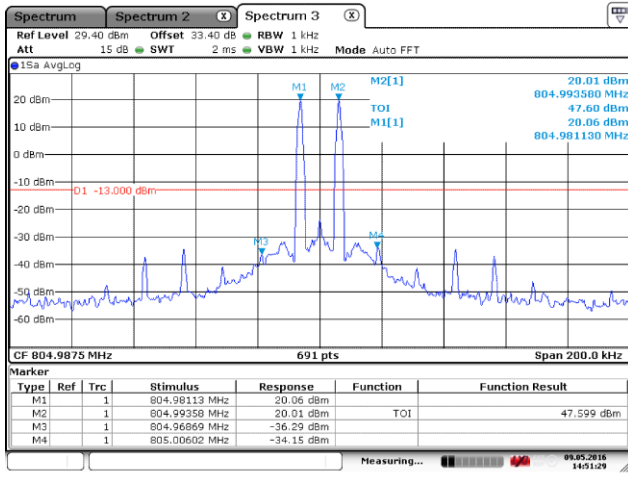
Mid Frequency and With the AGC threshold



Date: 9.MAY.2016 14:48:53

Mid Frequency and With the input signal

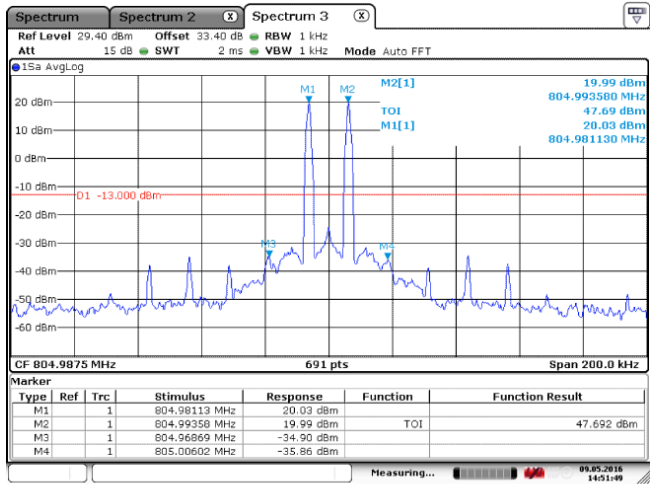
level



Date: 9.MAY.2016 14:51:29

High Frequency and With the AGC threshold level

amplitude set 3 dB above the ALC threshold

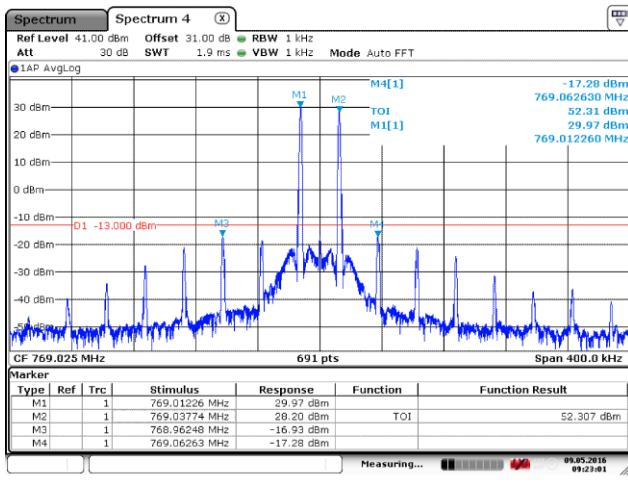


Date: 9.MAY.2016 14:51:50

High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

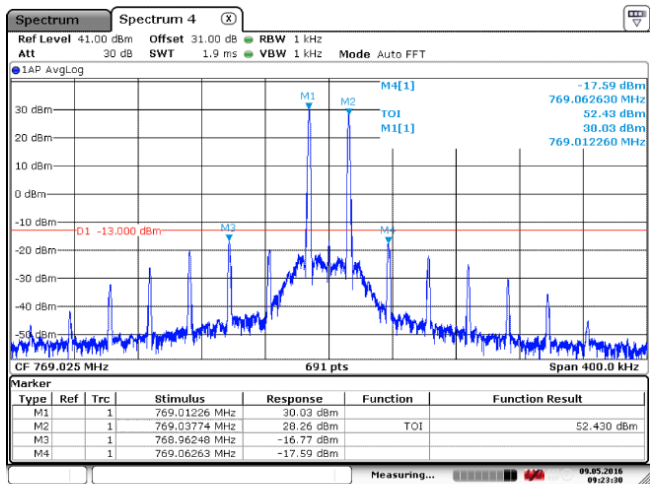
(2) Channel bandwidth 25kHz

(2.1) Downlink



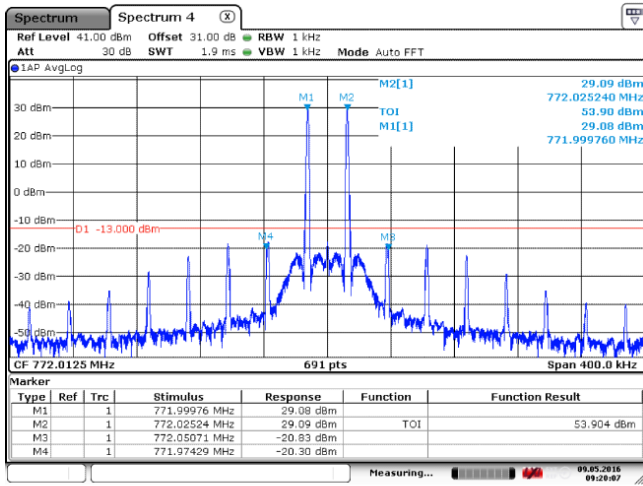
Date: 9.MAY.2016 09:23:01

Low Frequency 12and With the AGC threshold level



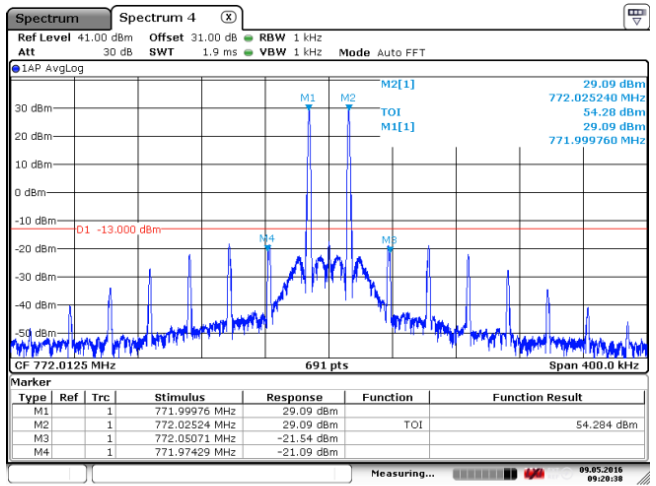
Date: 9.MAY.2016 09:23:30

Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



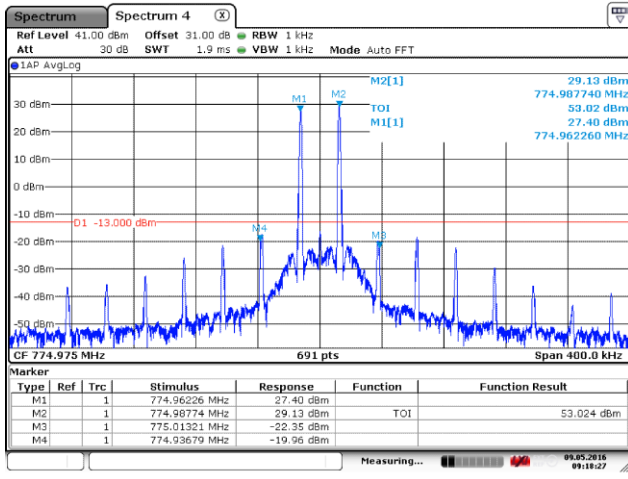
Date: 9.MAY.2016 09:20:07

Mid Frequency and With the AGC threshold level



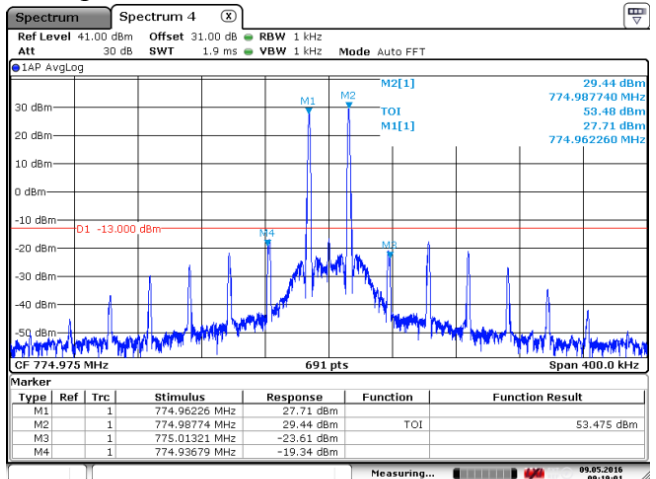
Date: 9.MAY.2016 09:20:38

Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold



Date: 9.MAY.2016 09:18:27

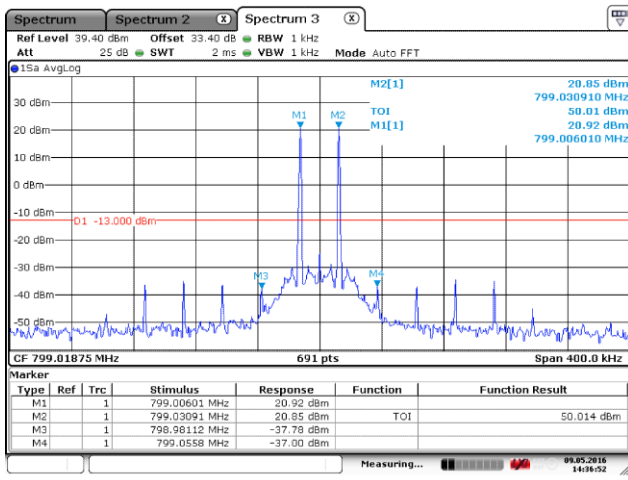
High Frequency and With the AGC threshold level



Date: 9.MAY.2016 09:19:01

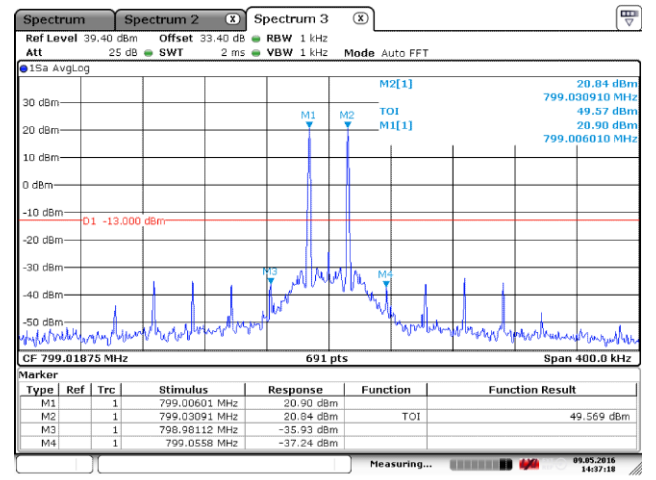
High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

(2.2) Uplink



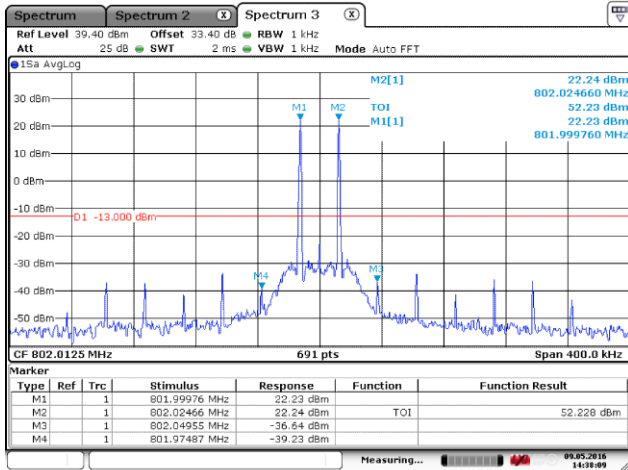
Date: 9.MAY.2016 14:06:52

Low Frequency and With the AGC threshold level

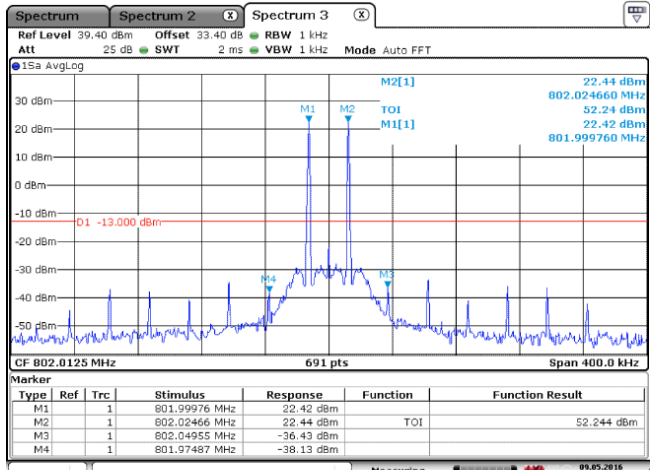


Date: 9.MAY.2016 14:07:18

Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



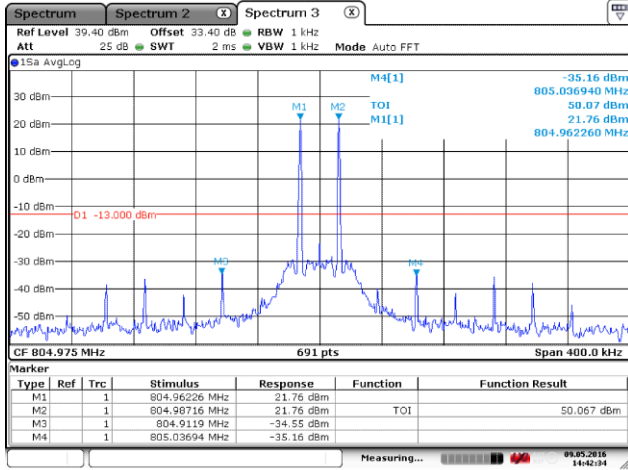
Date: 9.MAY.2016 14:38:09



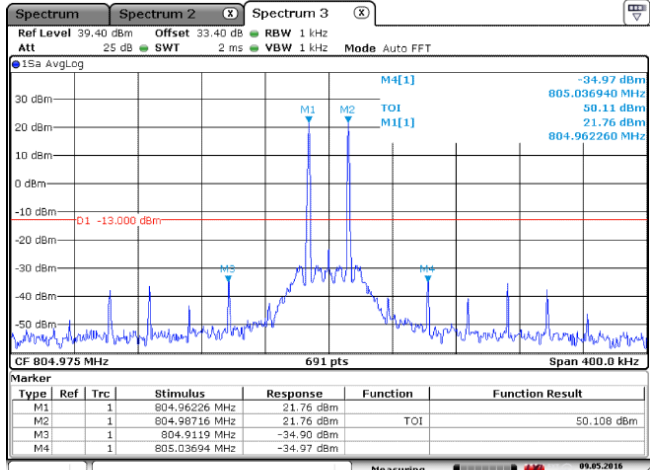
Date: 9.MAY.2016 14:39:11

Mid Frequency and With the AGC threshold level

Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold



Date: 9.MAY.2016 14:42:34



Date: 9.MAY.2016 14:43:21

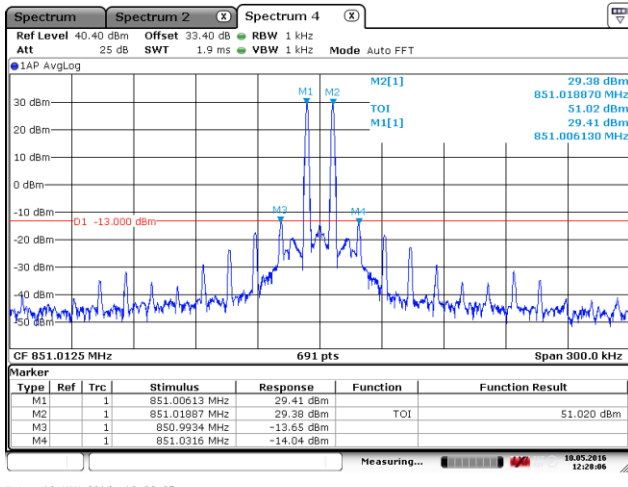
High Frequency and With the AGC threshold level

High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

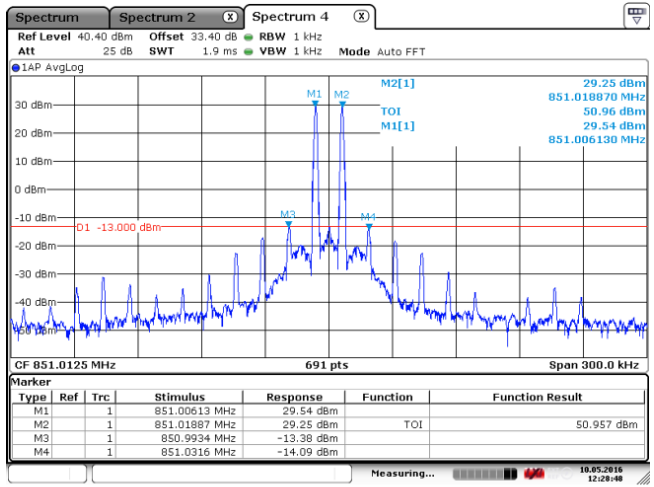
6.7.5.2 800MHz Band

(1) Channel bandwidth 12.5kHz

(1.1) Downlink

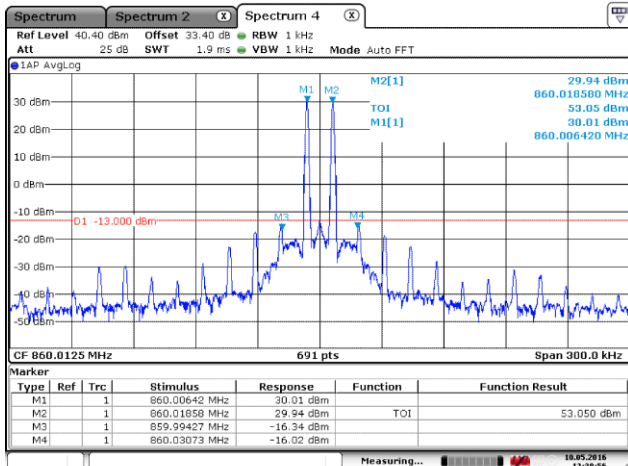


Date: 10.MAY.2016 12:28:07

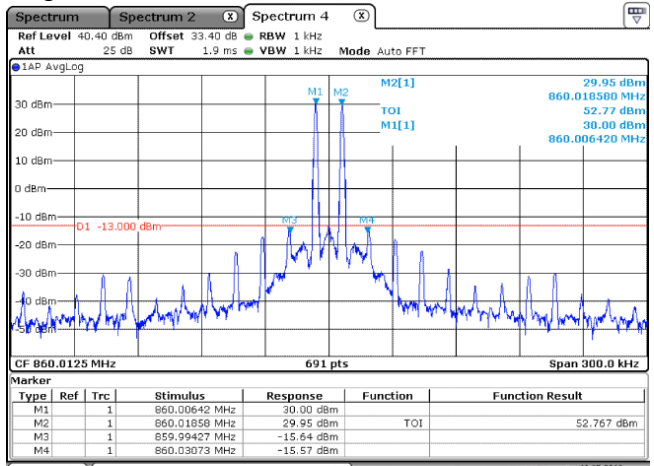


Date: 10.MAY.2016 12:28:48

Low Frequency 12and With the AGC threshold level



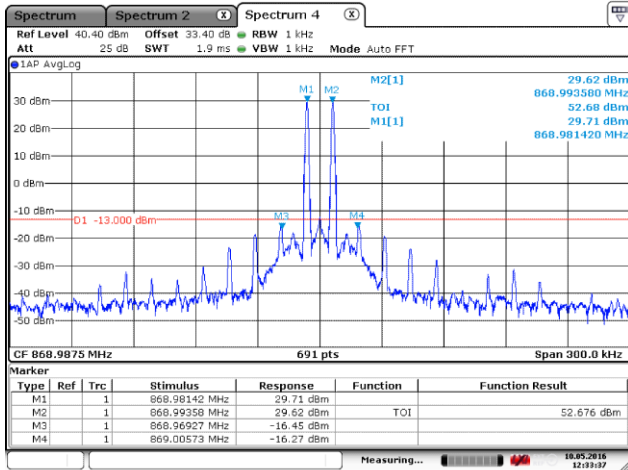
Date: 10.MAY.2016 12:30:56



Date: 10.MAY.2016 12:31:15

Mid Frequency and With the AGC threshold level

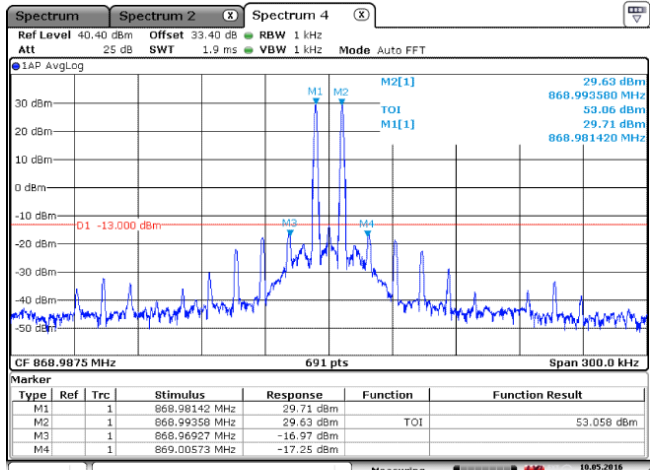
Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold



Date: 10.MAY.2016 12:33:38

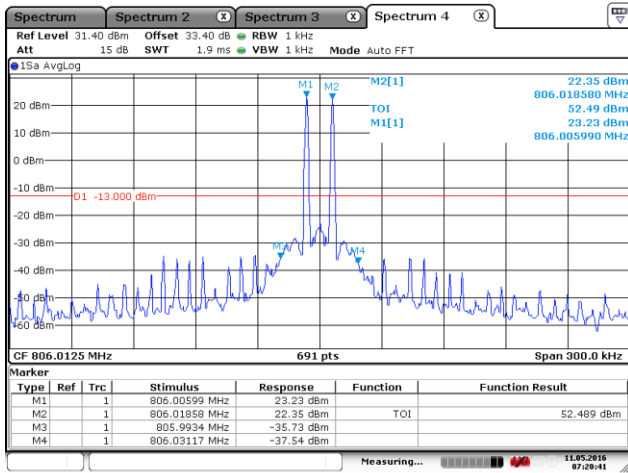
High Frequency and With the AGC threshold level

(1.2) Uplink



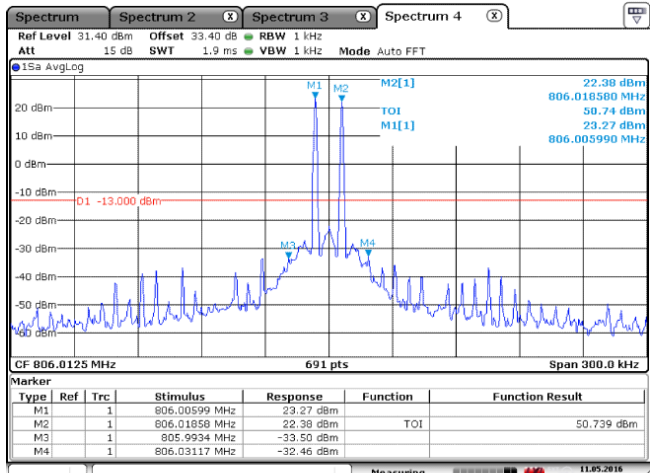
Date: 10.MAY.2016 12:33:29

High Frequency and With the input signal amplitude set 3 dB above the ALC threshold



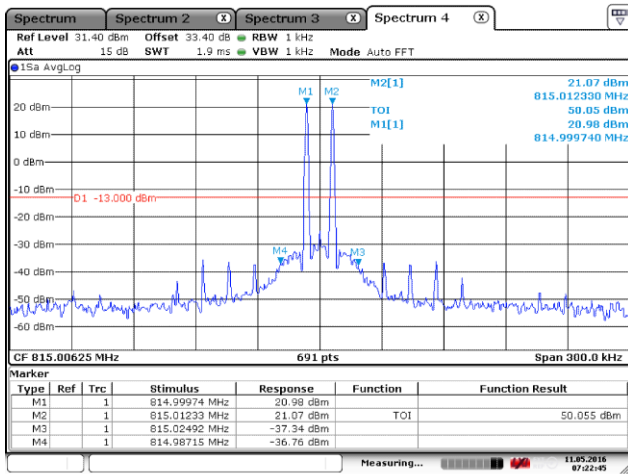
Date: 11.MAY.2016 07:20:41

Low Frequency and With the AGC threshold level



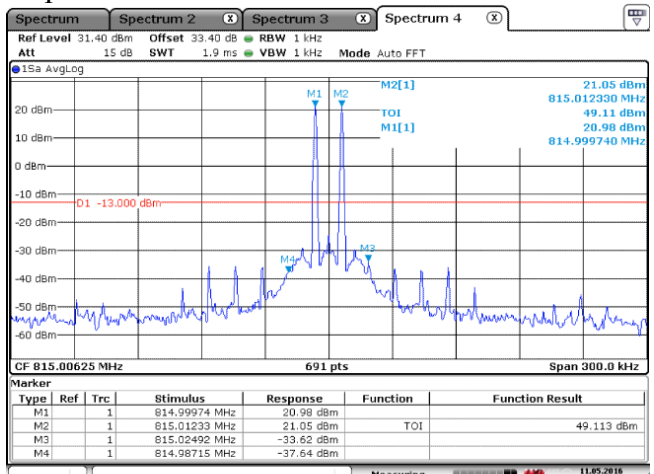
Date: 11.MAY.2016 07:20:54

Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



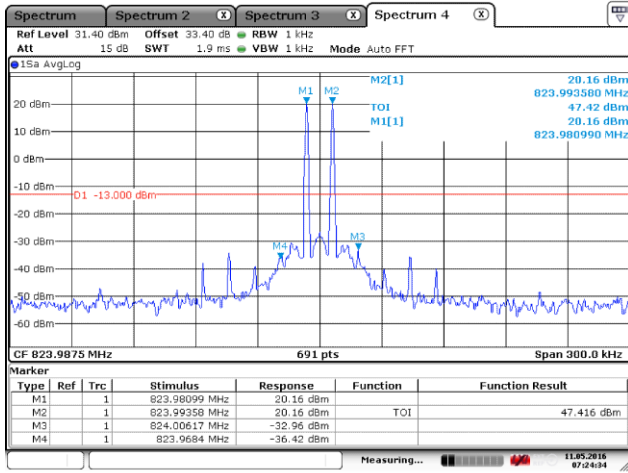
Date: 11.MAY.2016 07:22:44

Mid Frequency and With the AGC threshold level



Date: 11.MAY.2016 07:22:58

Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold

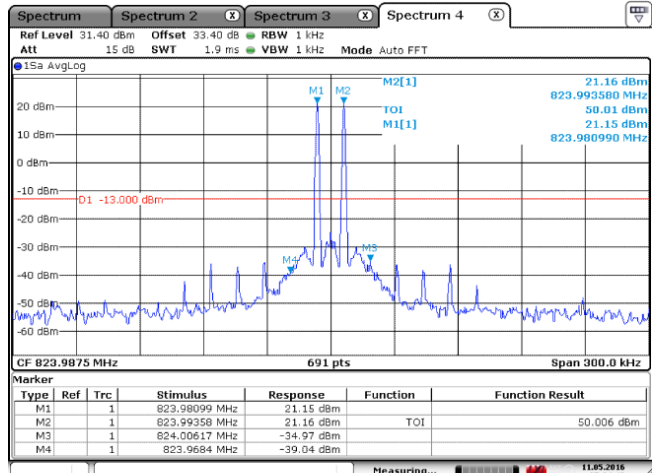


Date: 11.MAY.2016 07:24:33

High Frequency and With the AGC threshold level

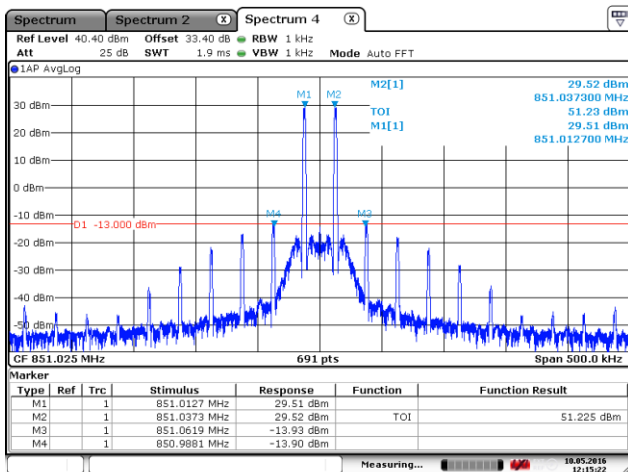
(2) Channel bandwidth 25kHz

(2.1) Downlink



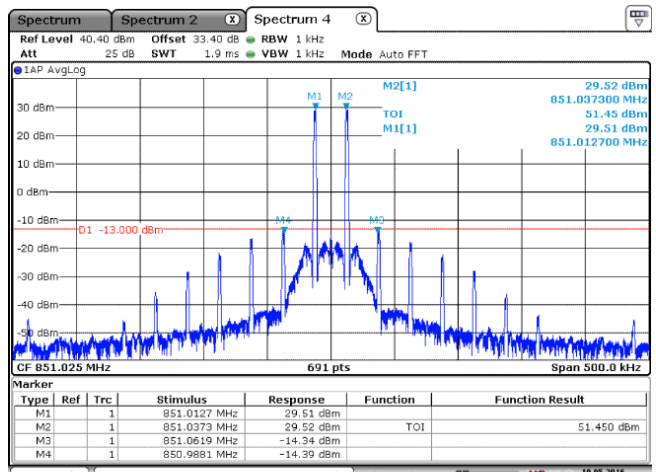
Date: 11.MAY.2016 07:24:43

High Frequency and With the input signal amplitude set 3 dB above the ALC threshold



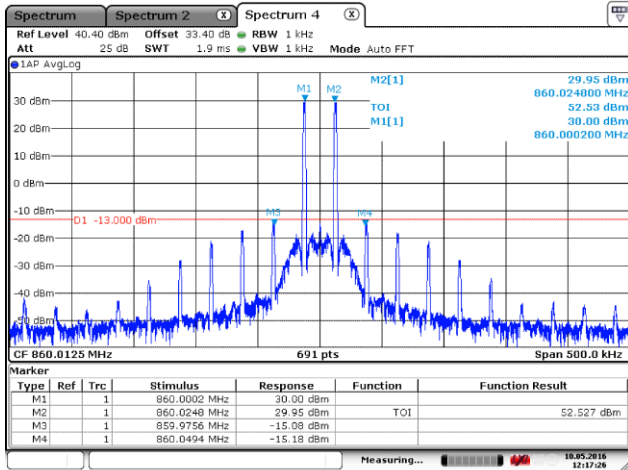
Date: 10.MAY.2016 12:15:23

Low Frequency 12and With the AGC threshold level

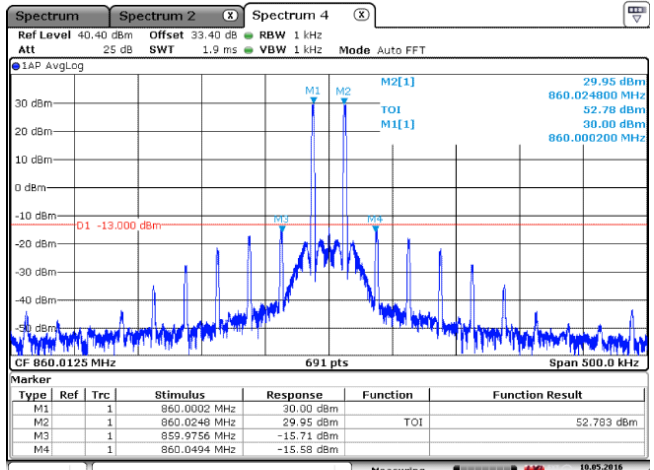


Date: 10.MAY.2016 12:15:45

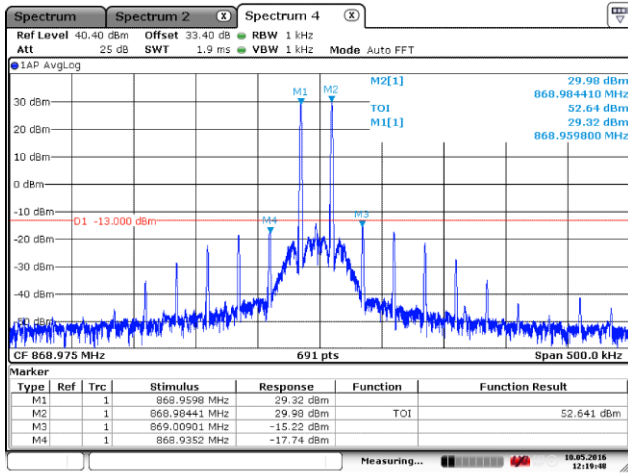
Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold



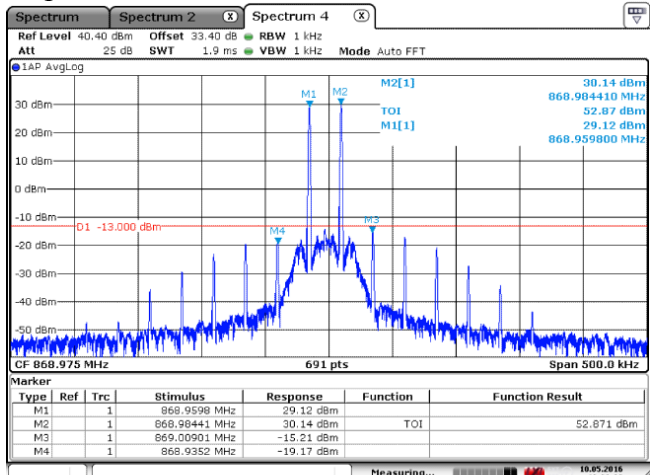
Mid Frequency and With the AGC threshold level



Mid Frequency and With the input signal amplitude set 3 dB above the ALC threshold

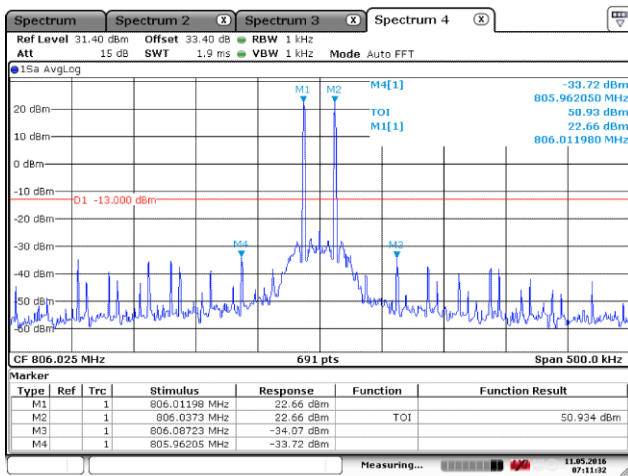


High Frequency and With the AGC threshold level

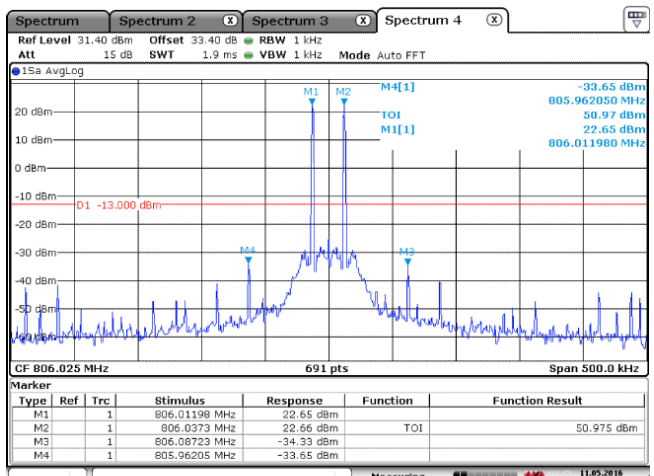


High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

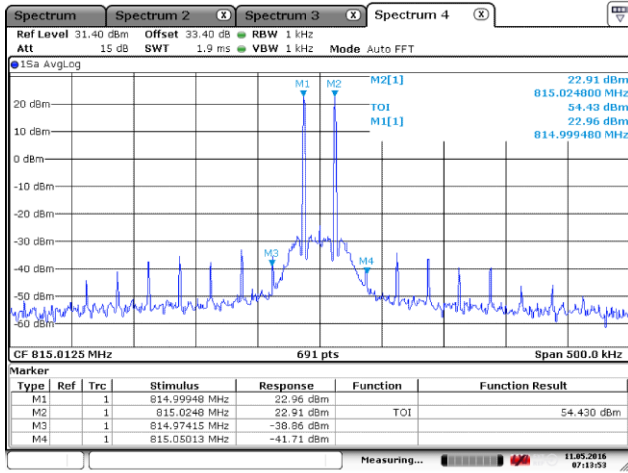
(2.2) Uplink



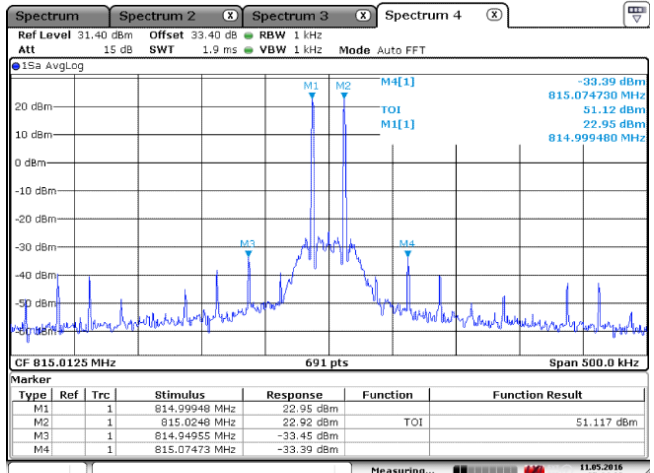
Low Frequency and With the AGC threshold level



Low Frequency and With the input signal amplitude set 3 dB above the ALC threshold

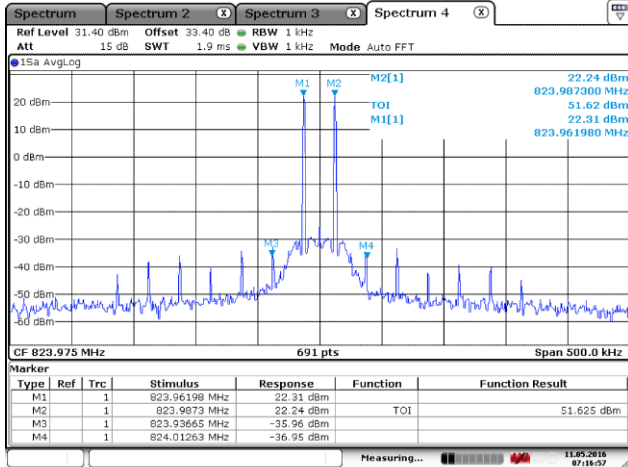


Date: 11.MAY.2016 07:13:53

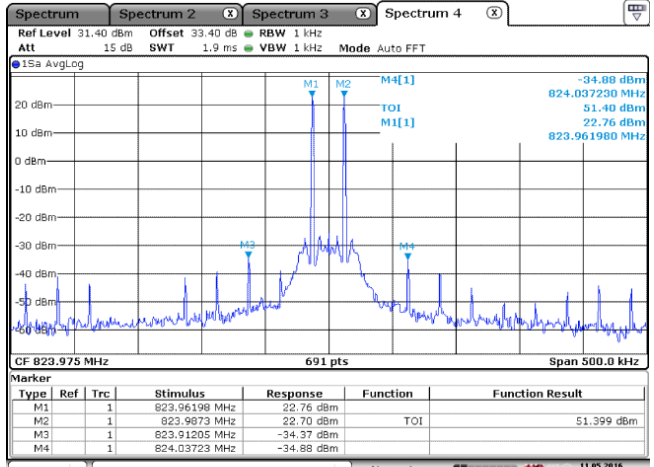


Date: 11.MAY.2016 07:14:38

Mid Frequency and With the AGC threshold level



Date: 11.MAY.2016 07:16:57



Date: 11.MAY.2016 07:17:36

High Frequency and With the AGC threshold level

High Frequency and With the input signal amplitude set 3 dB above the ALC threshold

6.8 Radiated spurious emissions

Test Date (yy-mm-dd): 2016-05-06 to 2016-05-15

Test environment: Normal

Ambient Temp 24.5°C~26.3°C, Humid 49%~65%, Atmospheric Pressure 101kpa

Power supply: AC 120V 50/60Hz

Test Method: KDB 935210 D05 Indus Booster Basic Meas v01r01
EIA/TIA 603- D-2010/2.2.12

Test Requirement: FCC part 90.219(e)(3)

6.8.1 Limit

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least -13 dBm.

6.8.2 Test configuration

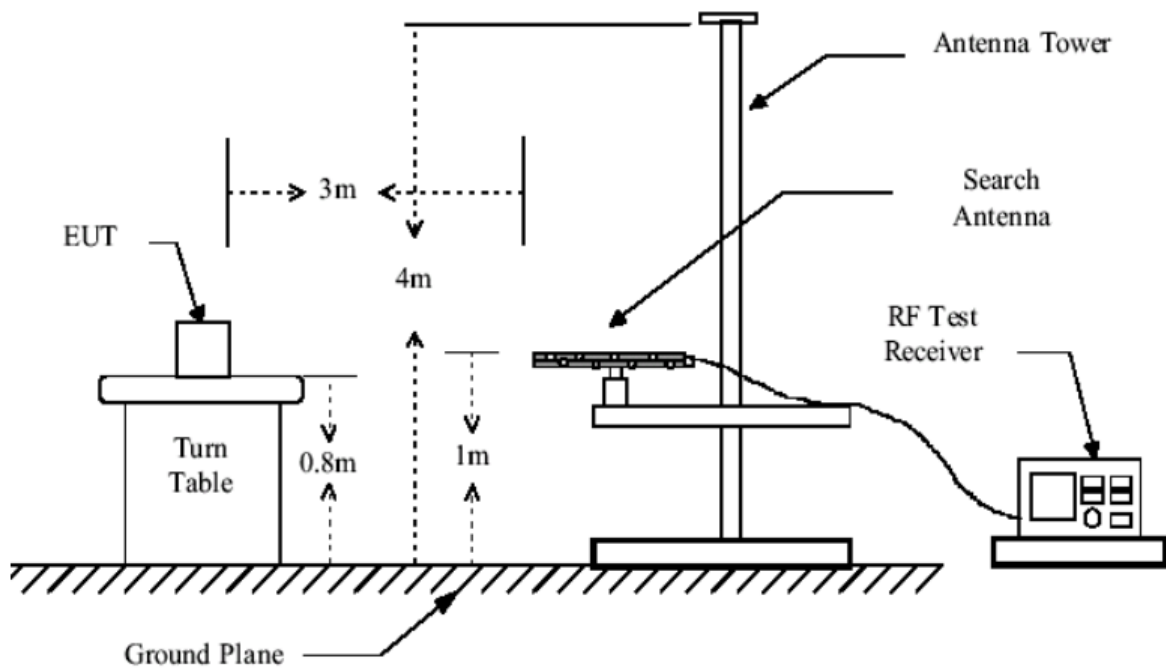


Figure 15: 30 MHz to 1 GHz radiated emissions test configuration

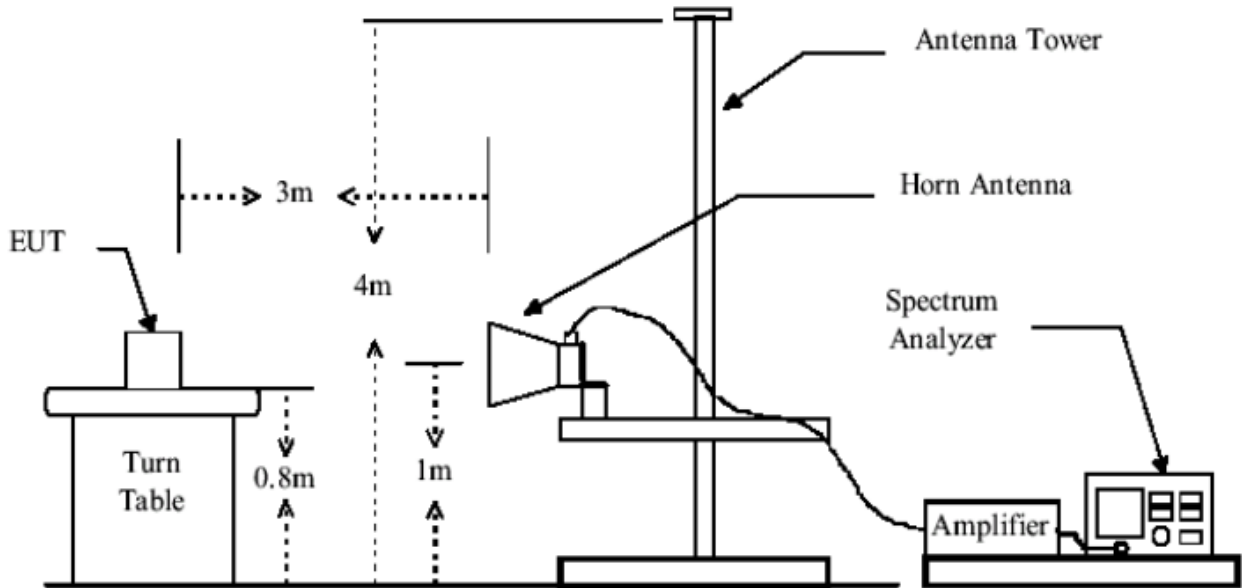
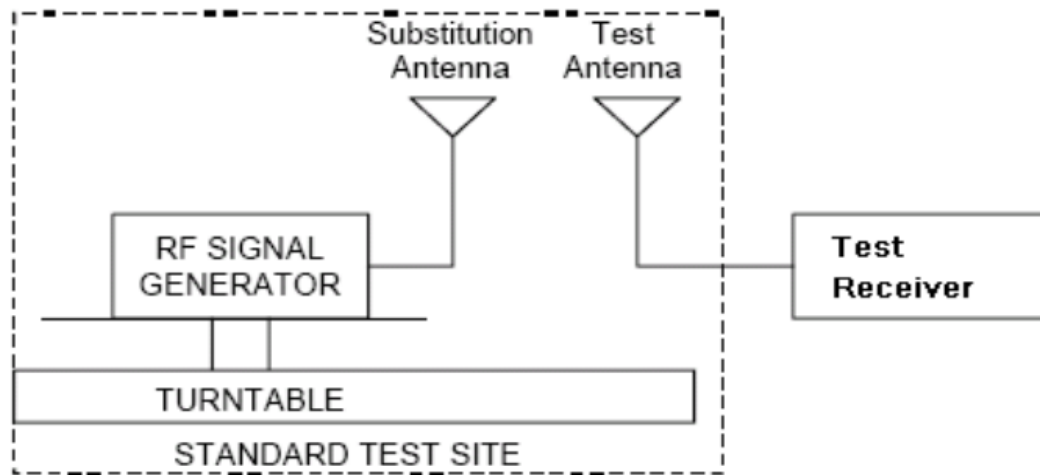


Figure 16: Above 1 GHz radiated emissions test configuration

6.8.3 Test procedures

- a) Connect the equipment as illustrated;
- b) Adjust the spectrum analyzer for the following setting;
 - 1) RBW=10kHz for spurious emission below 1 GHz, and 1MHz for spurious emission above 1GHz;
 - 2) VBW=300k for spurious emission below 1GHz, and 3MHz for spurious emission above 1GHz;
 - 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, or and FCC listed site compliant with ANSI C63.4-2001 clause 5.4. 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. For transmitters with integral antennas, the tests are to be run with the unit operating into the integral antenna.
- d) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth.

- e) Key the transmitter with 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 0.3m 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 he spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading or 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 step k) and i) 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:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss}(\text{dB}) + \text{antenna gain}(\text{dB})$$

Where:

P_d is the dipole equivalent power and P_g 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 and isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p and e.r.p.

$$e.r.p.(\text{dBm}) = e.i.r.p(\text{dB}) - 2.15$$

6.8.4 Test Results

6.8.4.1 700MHz Band

Vertical		Limit(dBm)	Margin(dB)	Result
Test Frequency (MHz)	Measuring level (dBm)			
Frequency range: 30MHz to 1GHz				
39.2884	-60.86	≤-13dBm	-47.86	pass
53.8188	-68.01		-55.01	pass
60.5598	-70.59		-57.59	pass
166.5241	-70.86		-57.86	pass
207.3274	-70.52		-57.52	pass
288.8331	-68.25		-55.25	pass
Frequency range: 1GHz to 6GHz				
2127.996	-77.20	≤-13dBm	-64.20	pass
3171.823	-75.80		-62.80	pass
3457.165	-76.54		-63.54	pass
4593.850	-77.94		-64.94	pass
4978.446	-77.58		-64.58	pass
5242.525	-77.58		-64.58	pass

Note:
Sweep all the modulation types emissions in 700MHz Band , find the worse case to report it..

Horizontal		Limit(dBm)	Margin(dB)	Result
Test Frequency (MHz)	Measuring level (dBm)			
Frequency range: 30MHz to 1GHz				
39.2884	-79.83	≤-13dBm	-66.83	pass
54.4271	-77.96		-64.96	pass
166.5241	-70.86		-57.86	pass
207.3274	-73.87		-60.87	pass
288.8331	-67.98		-54.98	pass
576.5407	-70.43		-57.43	pass
Frequency range: 1GHz to 6GHz				
2885.073	-72.98	≤-13dBm	-59.98	pass
3171.823	-68.81		-55.81	pass
3457.165	-72.80		-59.80	pass
4660.279	-69.30		-56.30	pass
4907.481	-68.94		-55.94	pass
5914.473	-68.07		-55.07	pass
Note: Sweep all the modulation types emissions in 700MHz Band , find the worse case to report it..				

6.8.4.2 800MHz Band

Vertical		Limit(dBm)	Margin(dB)	Result
Test Frequency (MHz)	Measuring level (dBm)			
Frequency range: 30MHz to 1GHz				
39.2884	-67.32	≤-13dBm	-54.32	pass
51.1646	-65.65		-52.65	pass
54.1221	-66.90		-53.9	pass

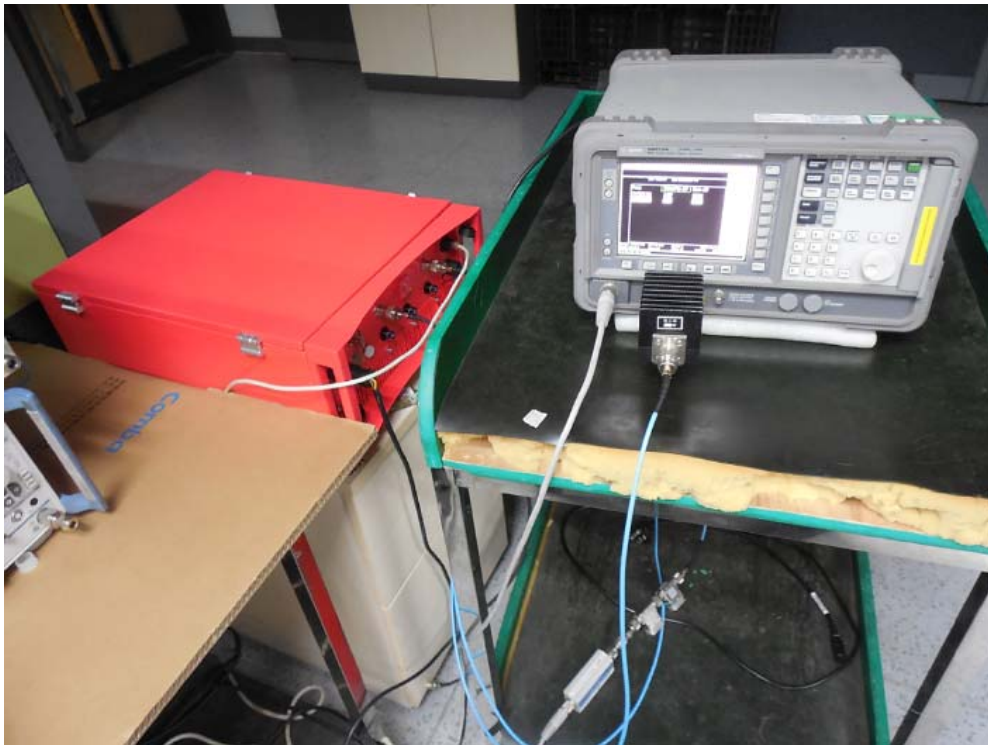
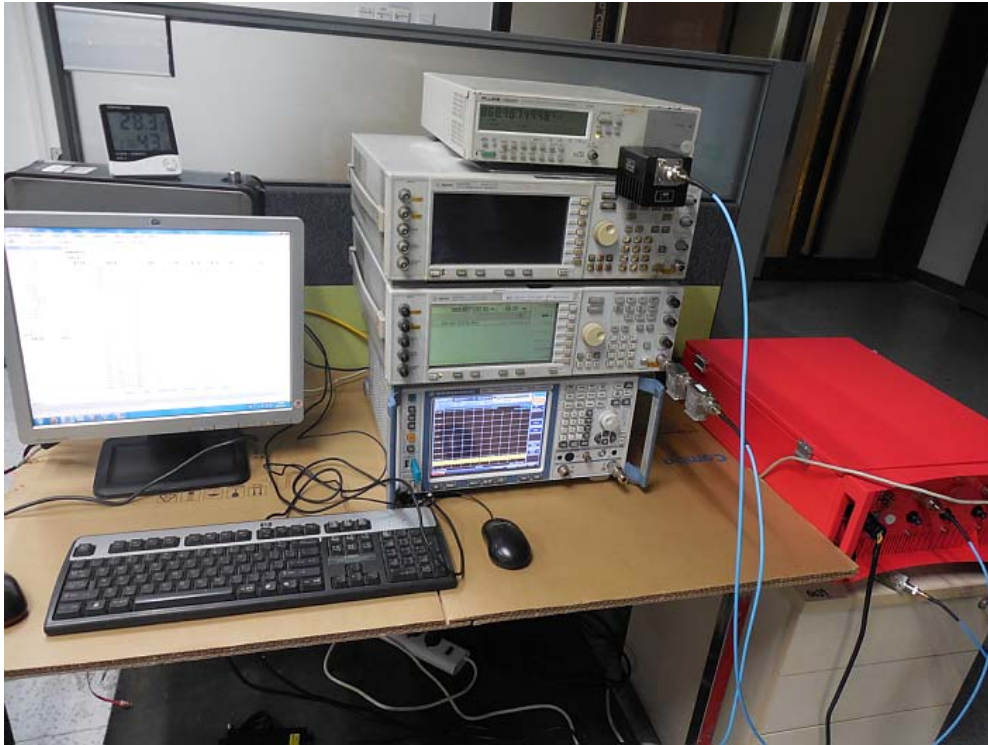
164.6630	-69.79		-56.79	pass
206.1656	-73.23		-60.23	pass
293.7438	-69.09		-56.09	pass
Frequency range: 1GHz to 6GHz				
1638.666	-78.68	≤-13dBm	-65.68	pass
1897.096	-78.24		-65.24	pass
2669.849	-74.76		-61.76	pass
3236.222	-68.31		-55.31	pass
4949.938	-69.55		-56.55	pass
5931.480	-67.34		-54.34	pass
<p>Note: Sweep all the modulation types emissions in 800MHz Band , find the worse case to report it..</p>				

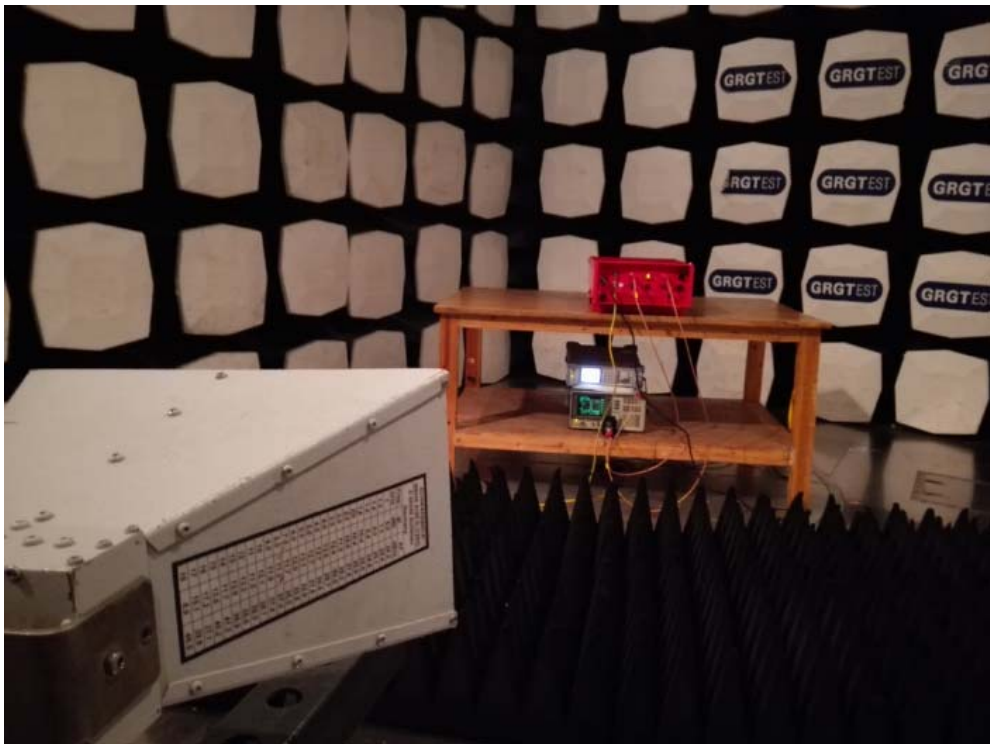
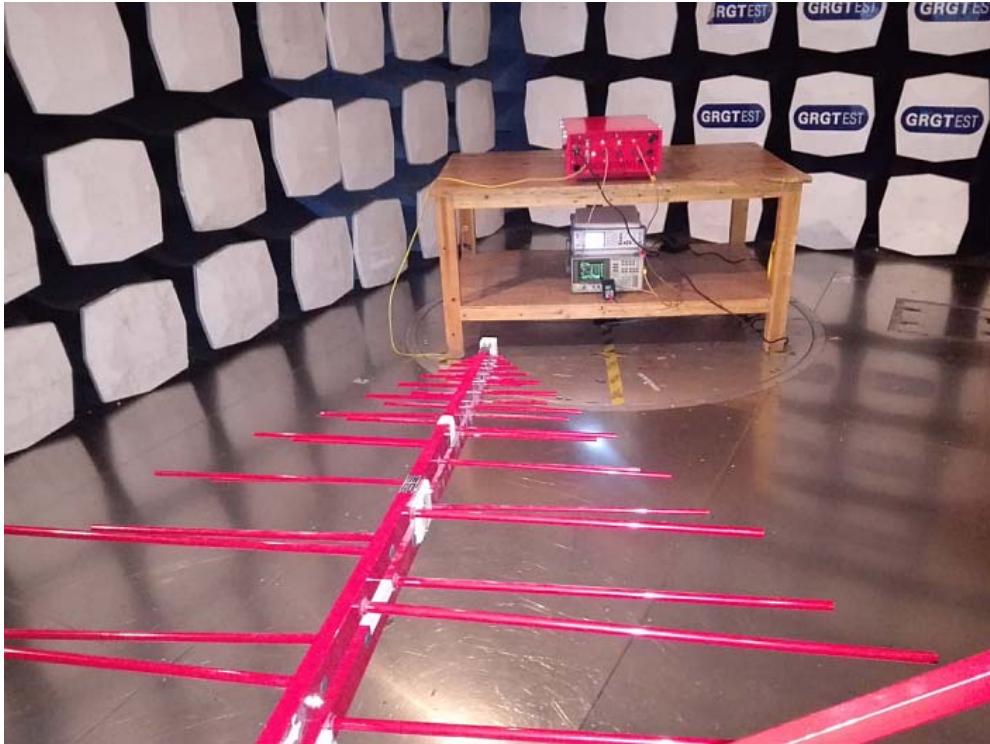
Horizontal		Limit(dBm)	Margin(dB)	Result
Test Frequency (MHz)	Measuring level (dBm)			
Frequency range: 30MHz to 1GHz				
39.2884	-79.94	≤-13dBm	-66.94	pass
55.0423	-76.24		-63.24	pass
164.6630	-70.63		-57.63	pass
206.1657	-73.98		-60.98	pass
293.7438	-70.34		-57.34	pass
589.6468	-71.27		-58.27	pass
Frequency range: 1GHz to 6GHz				
2196.282	-77.77	≤-13dBm	-64.77	pass
2935.209	-73.49		-60.49	pass
3236.222	-67.42		-54.42	pass
3588.654	-73.77		-60.77	pass
4412.841	-69.54		-56.54	pass
5863.743	-67.99		-54.99	pass

Note:

Sweep all the modulation types emissions in 800MHz Band , find the worse case to report it..

APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM





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