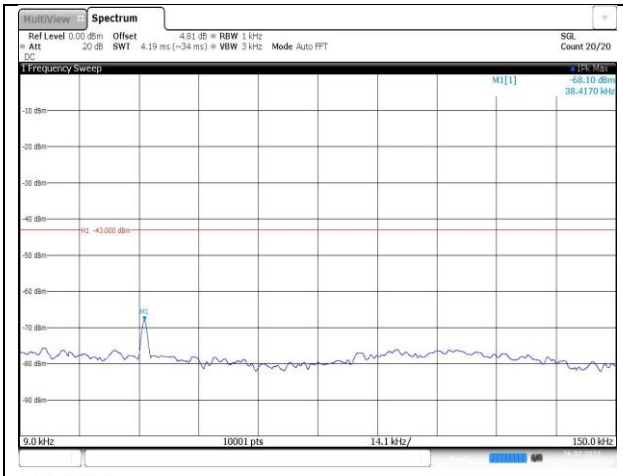
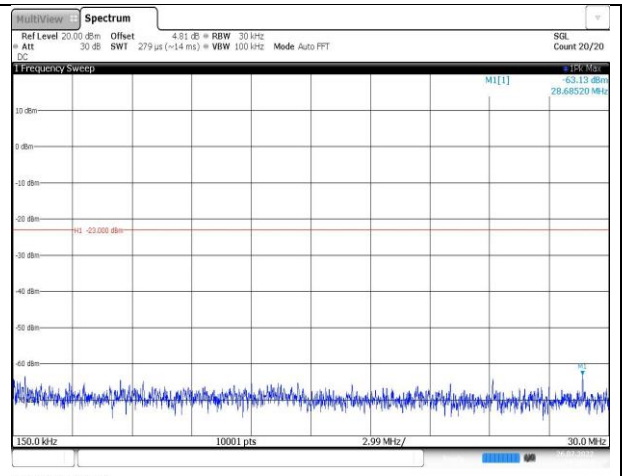
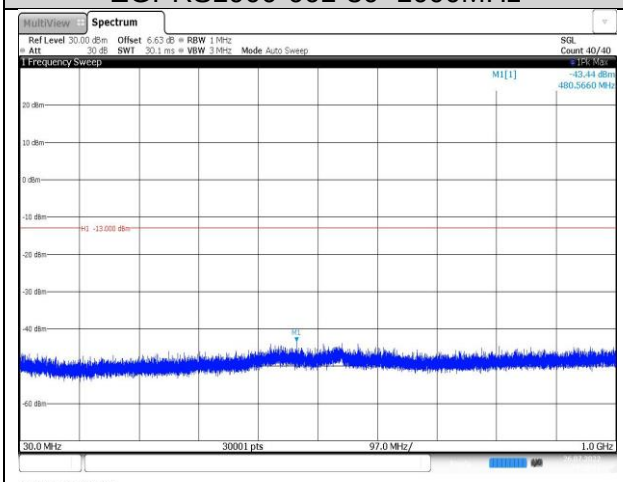


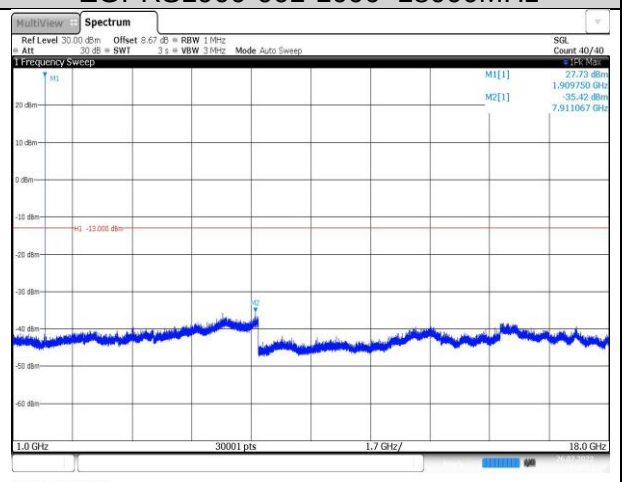
EGPRS1900-661-30~1000MHz



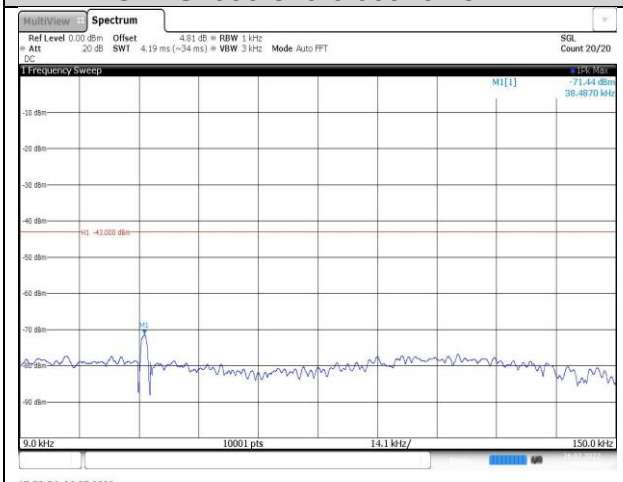
EGPRS1900-661-1000~18000MHz



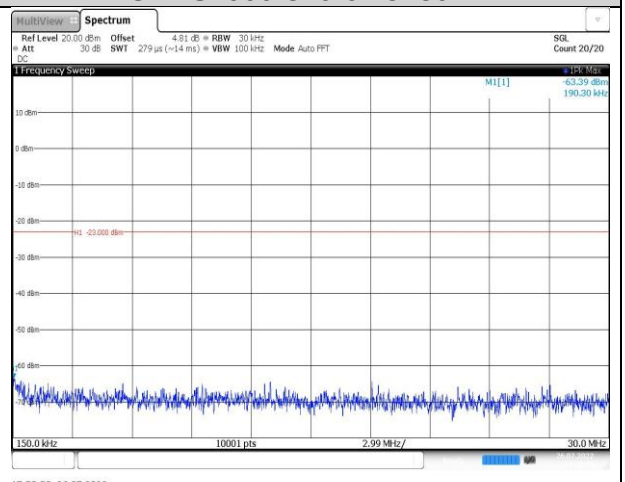
EGPRS1900-810-0.009~0.15MHz



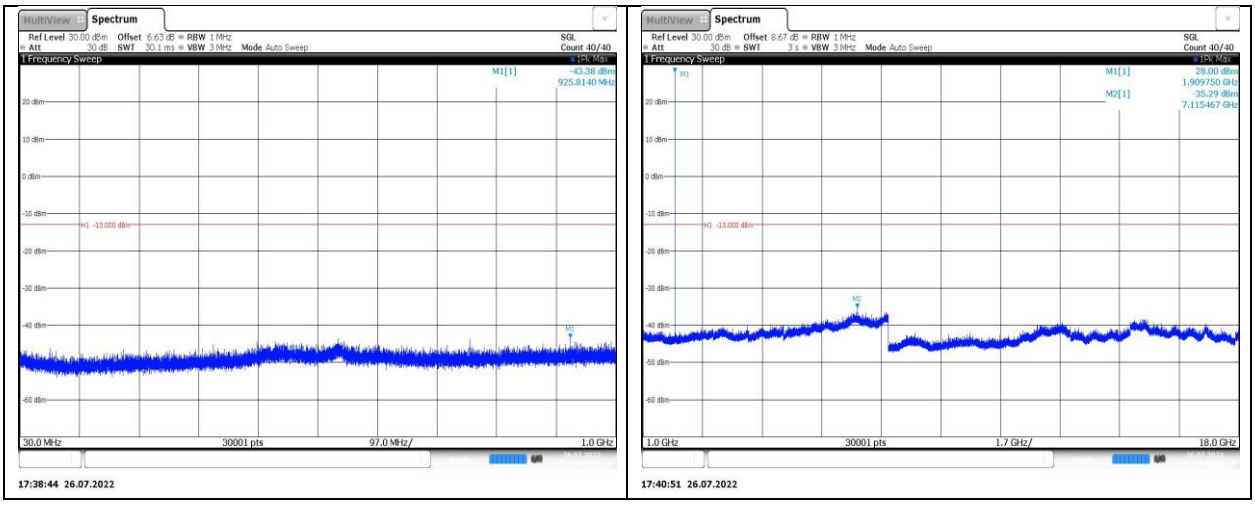
EGPRS1900-810-0.15~30MHz



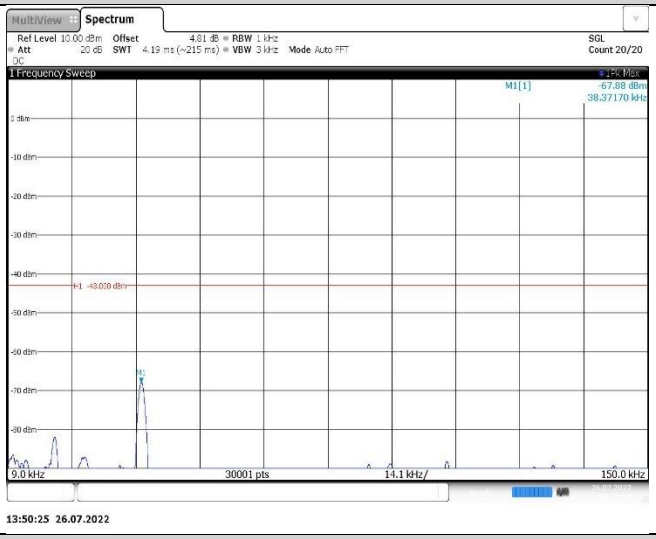
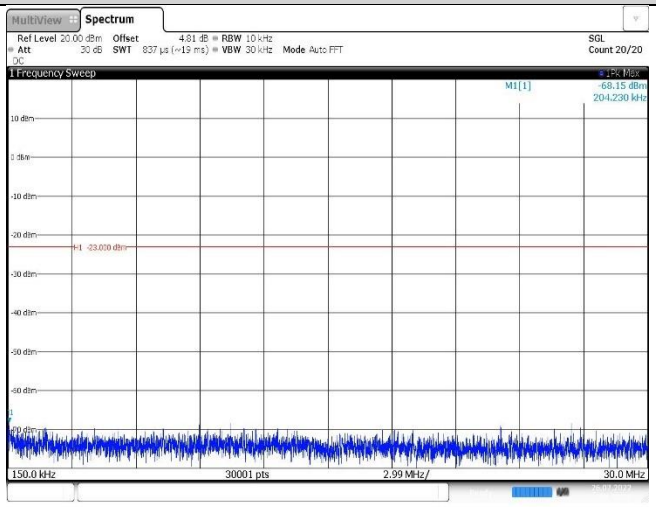
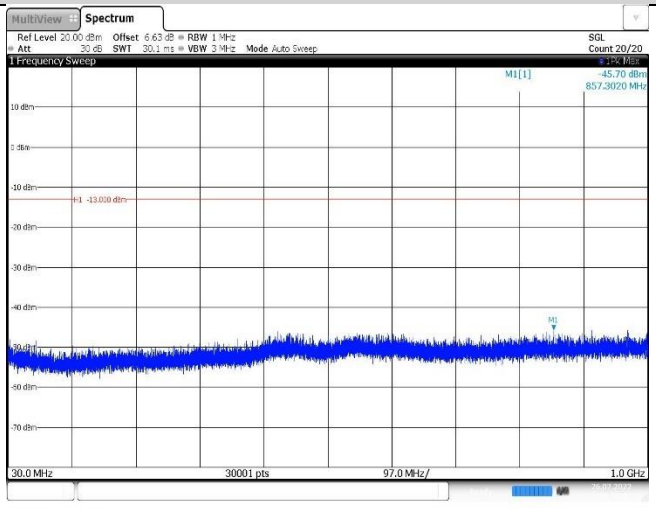
EGPRS1900-810-30~1000MHz



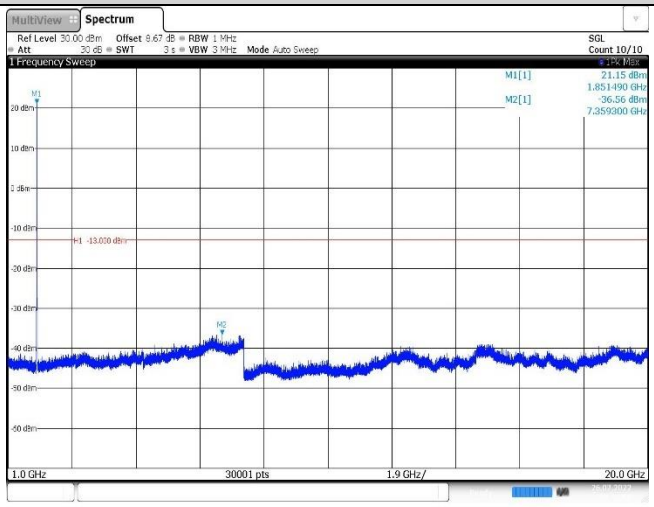
EGPRS1900-810-1000~18000MHz



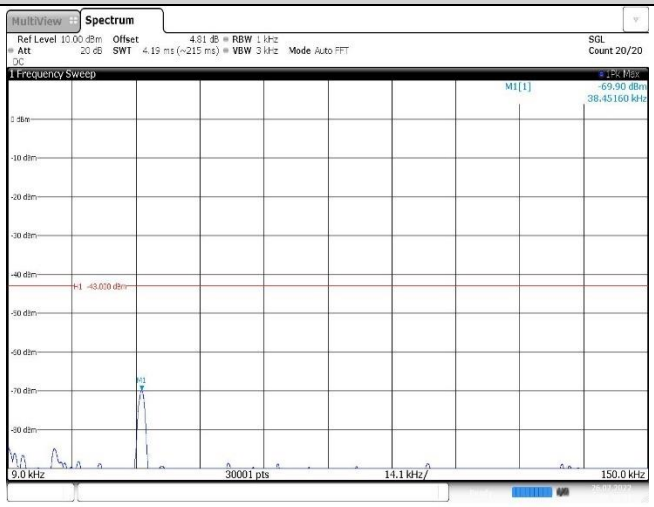
WCDMA

Band2-9262-0.009~0.15MHz

Band2-9262-0.15~30MHz

Band2-9262-30~1000MHz


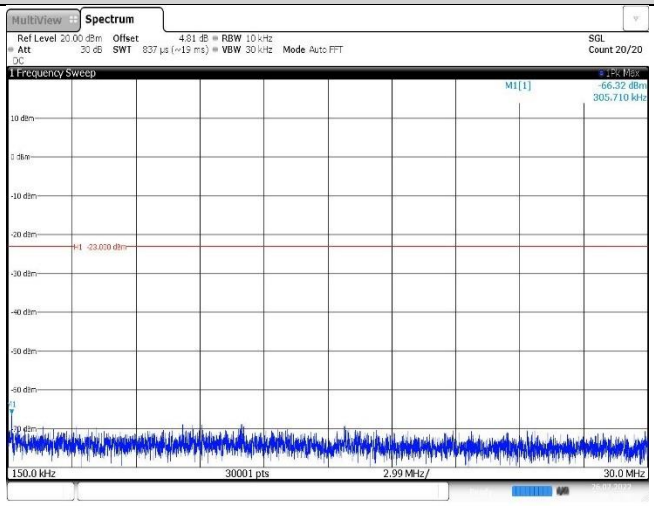
Band2-9262-1000~20000MHz



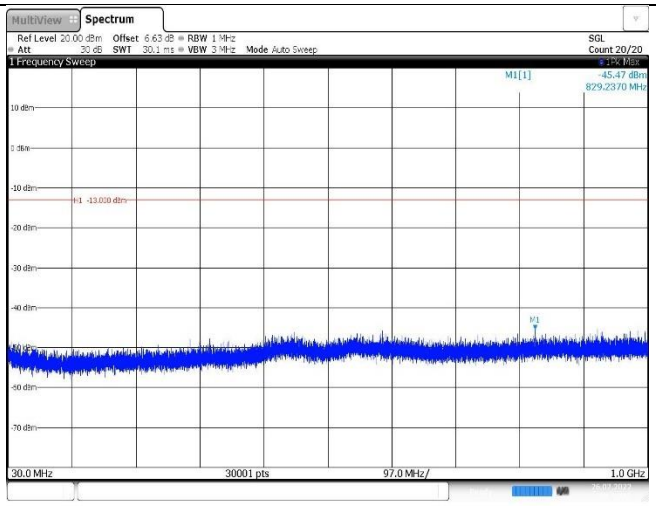
Band2-9400-0.009~0.15MHz



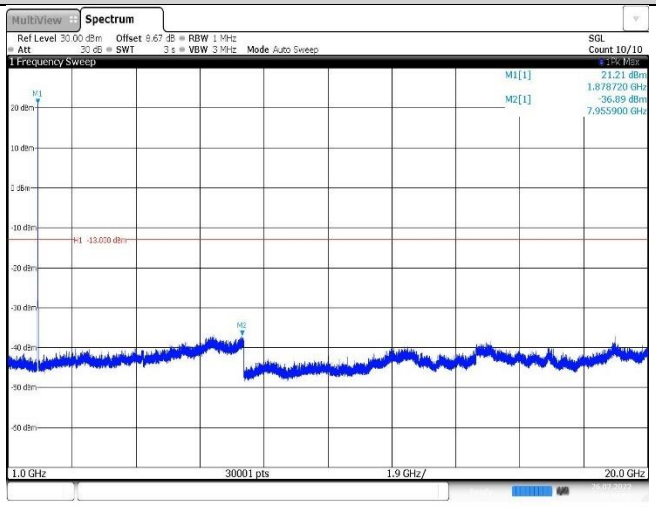
Band2-9400-0.15~30MHz



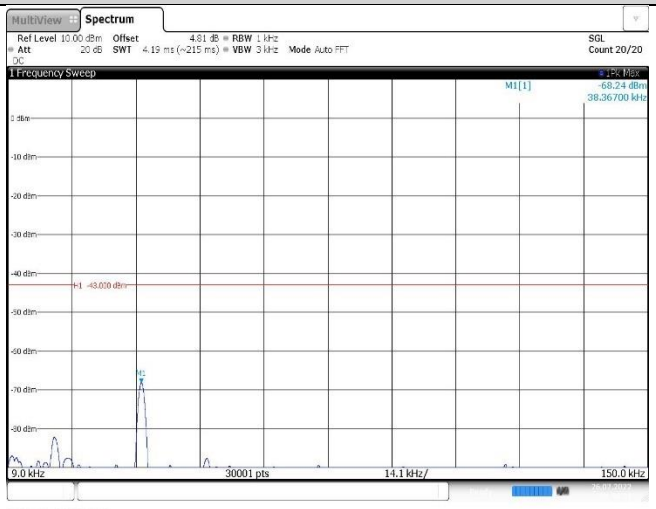
Band2-9400-30~1000MHz



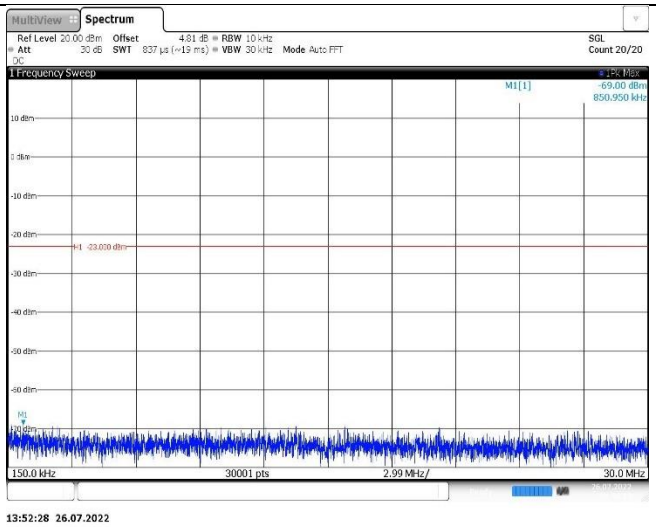
Band2-9400-1000~20000MHz



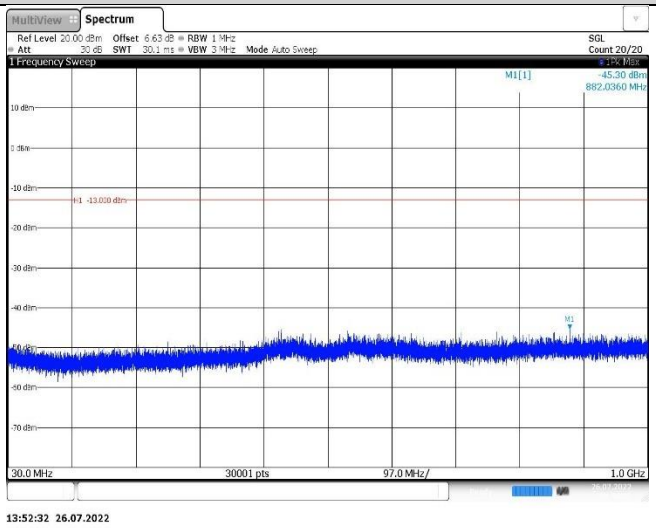
Band2-9538-0.009~0.15MHz



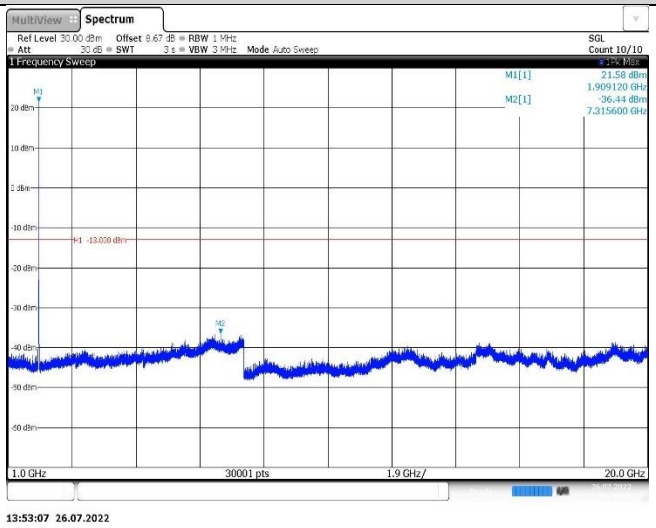
Band2-9538-0.15~30MHz



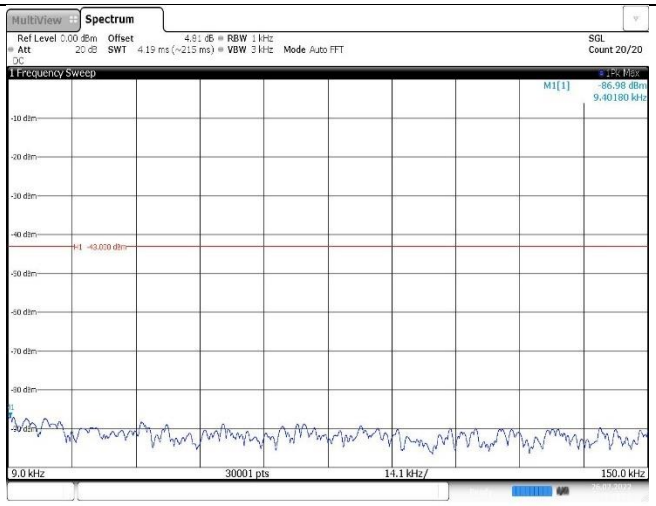
Band2-9538-30~1000MHz



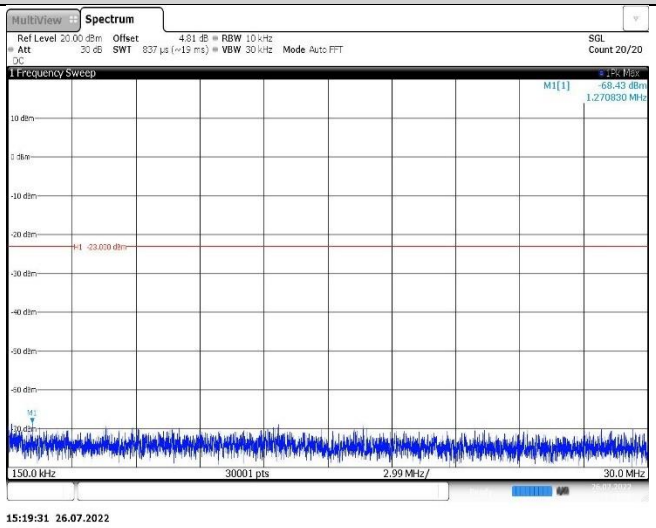
Band2-9538-1000~20000MHz



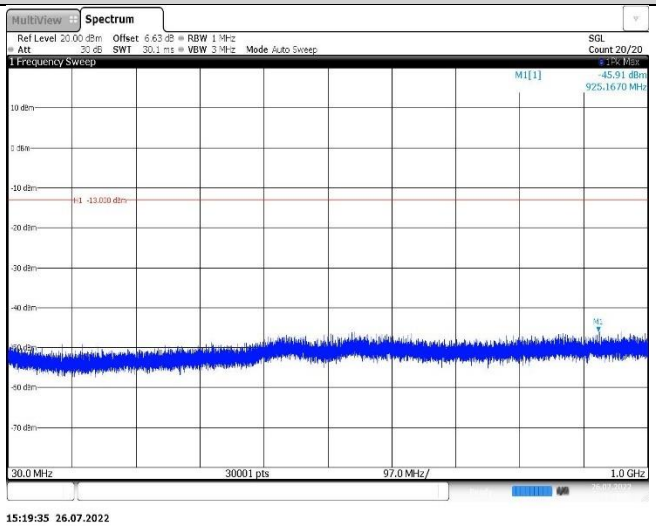
Band4-1312-0.009~0.15MHz



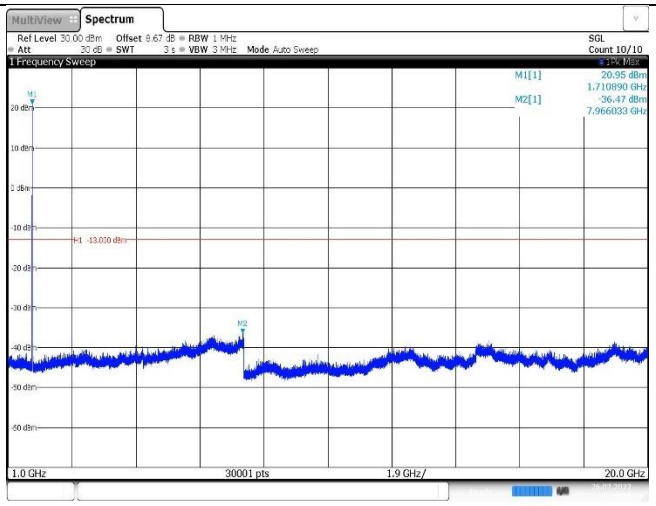
Band4-1312-0.15~30MHz



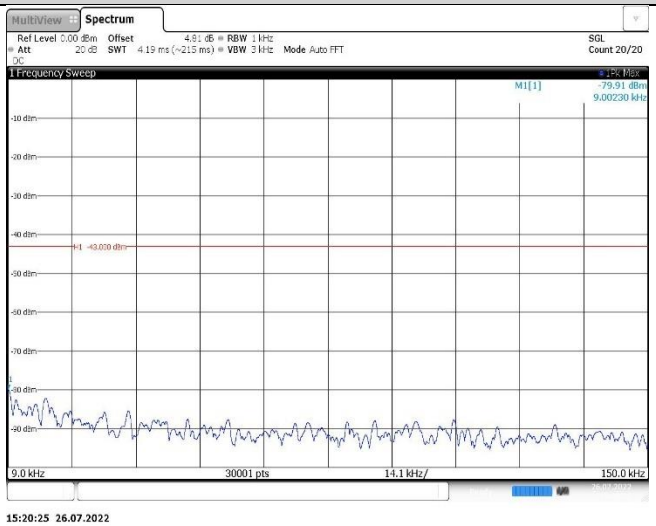
Band4-1312-30~1000MHz



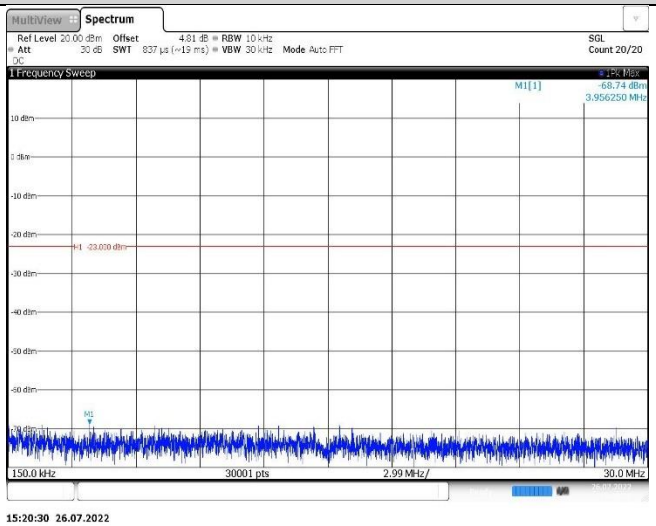
Band4-1312-1000~20000MHz



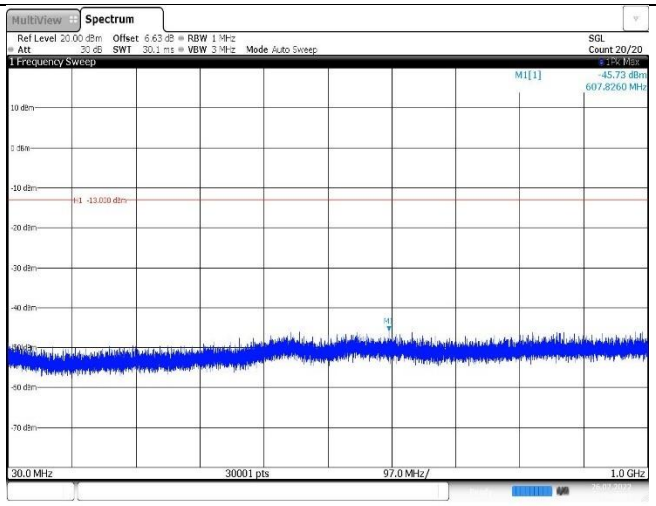
Band4-1413-0.009~0.15MHz



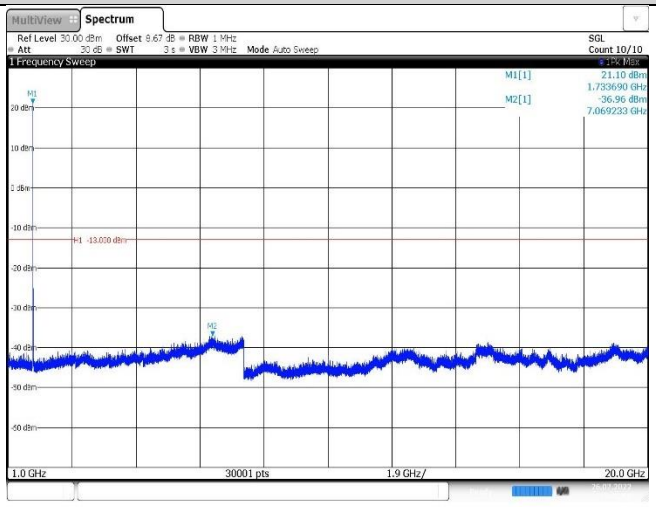
Band4-1413-0.15~30MHz



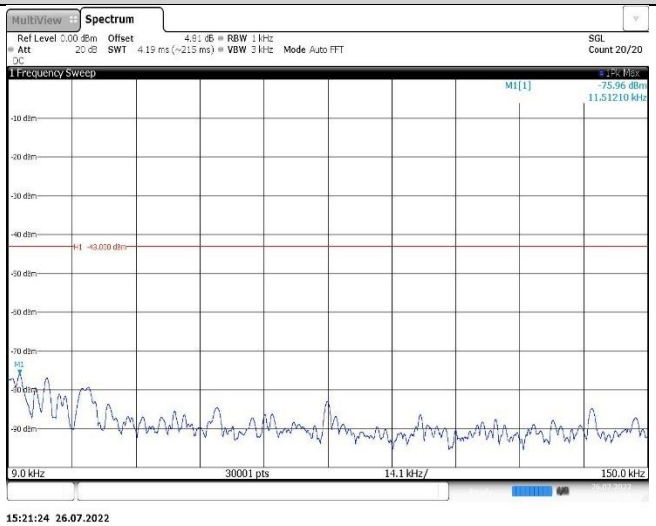
Band4-1413-30~1000MHz



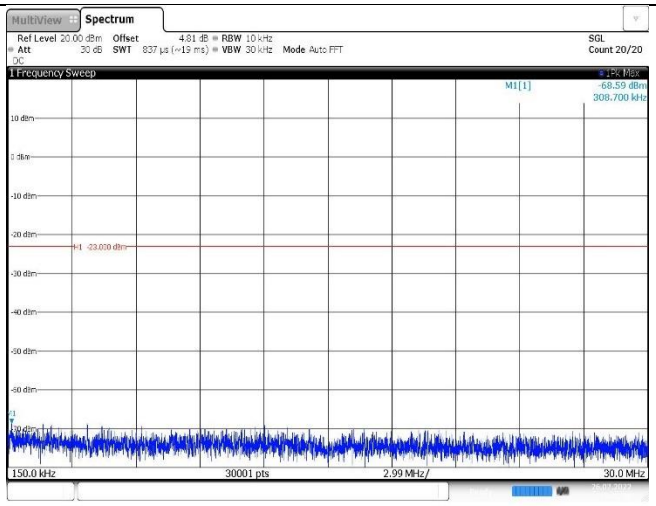
Band4-1413-1000~20000MHz



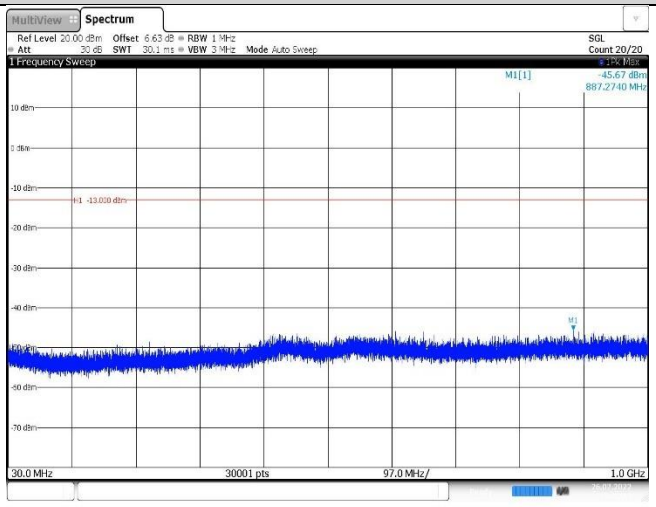
Band4-1513-0.009~0.15MHz



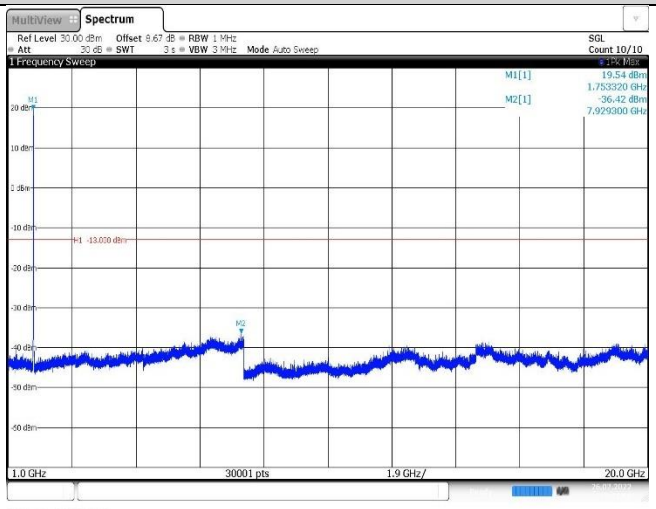
Band4-1513-0.15~30MHz



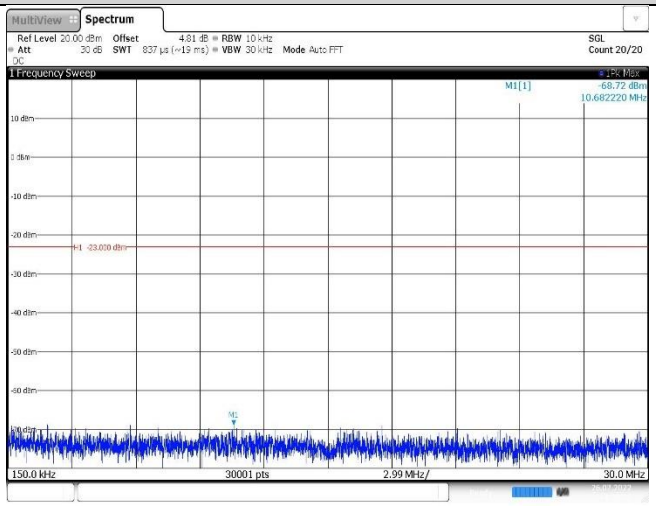
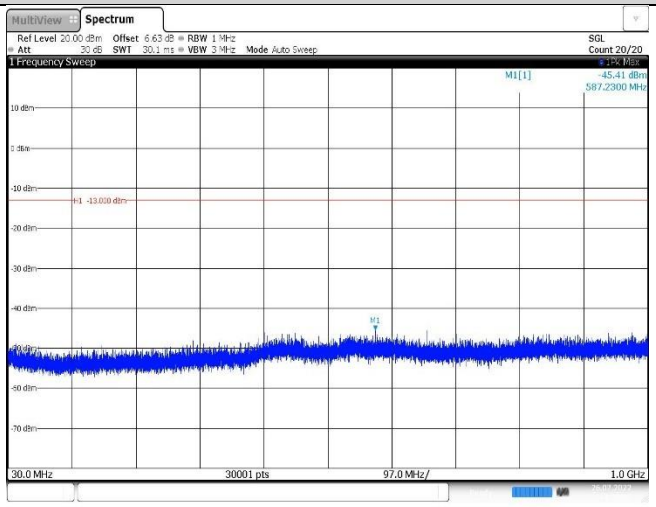
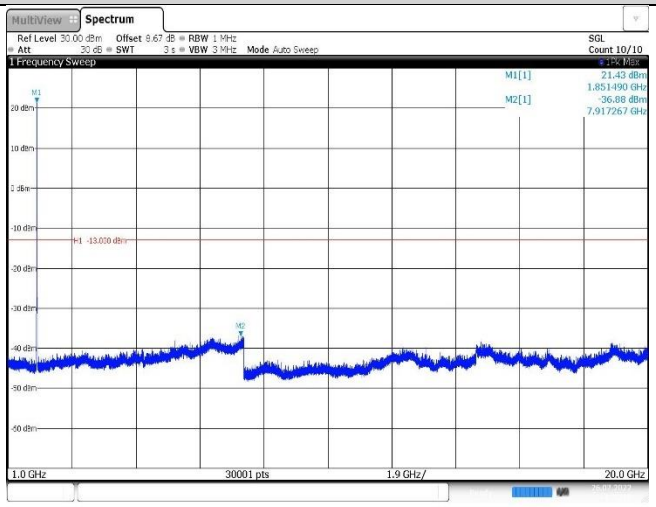
Band4-1513-30~1000MHz

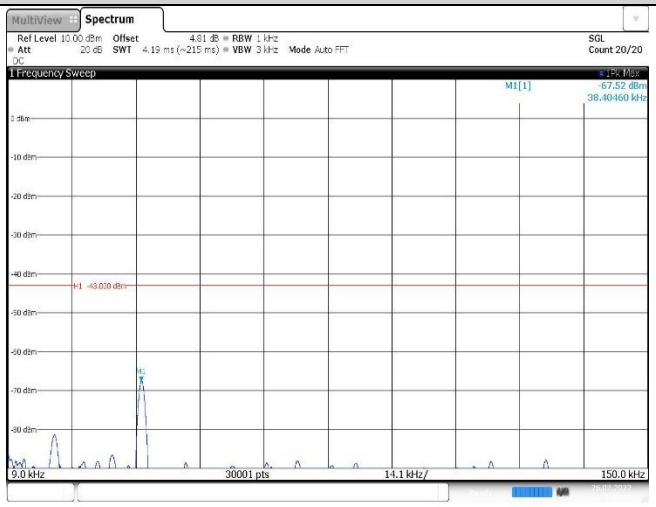
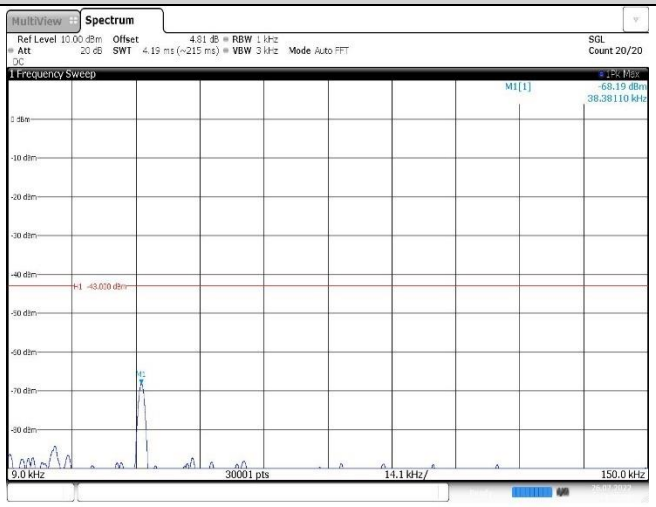
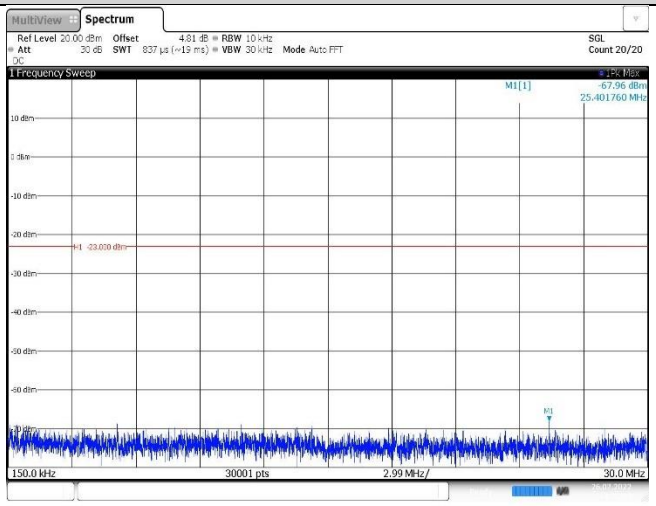


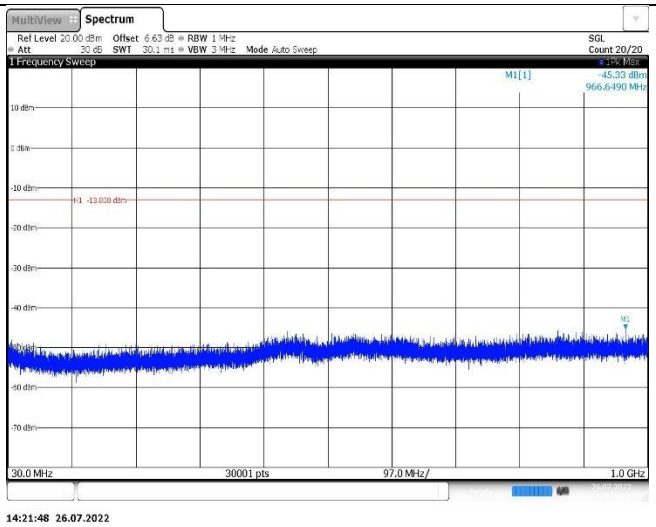
Band4-1513-1000~20000MHz



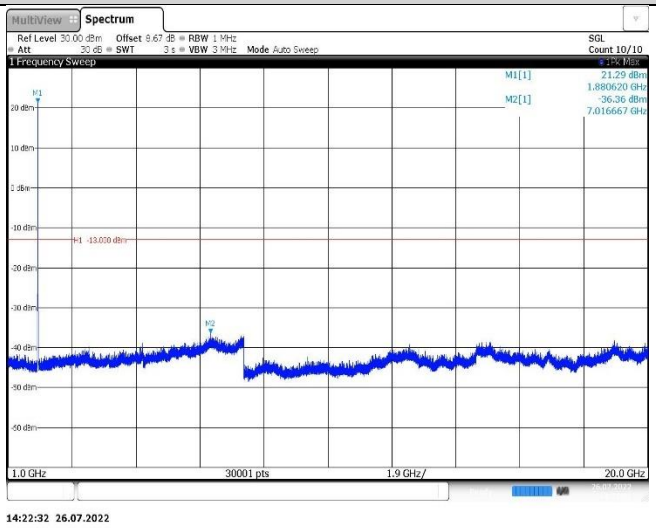
HSDPA

Band2-9262-4-0.15~30MHz

Band2-9262-4-30~1000MHz

Band2-9262-4-1000~20000MHz


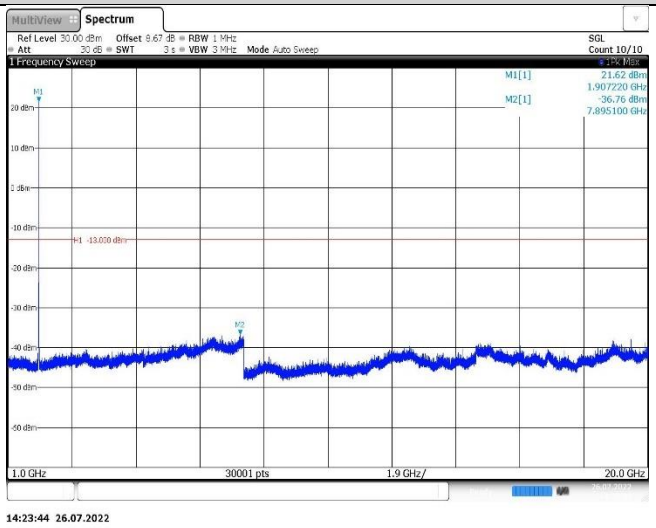
Band2-9262-4-0.009~0.15MHz

Band2-9400-4-0.009~0.15MHz

Band2-9400-4-0.15~30MHz

Band2-9400-4-30~1000MHz



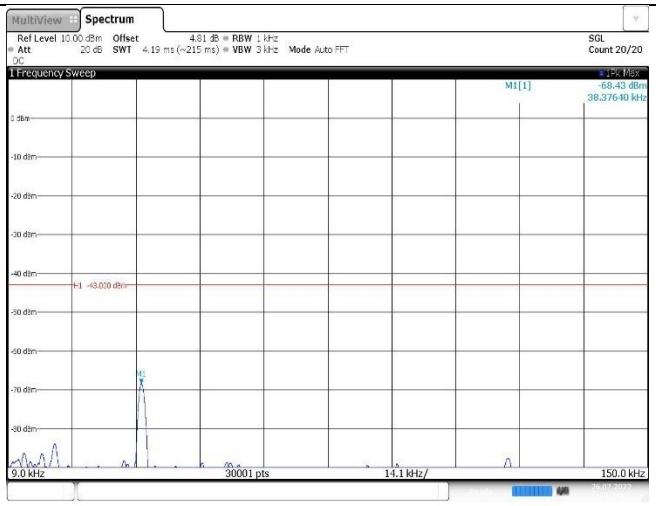
Band2-9400-4-1000~20000MHz



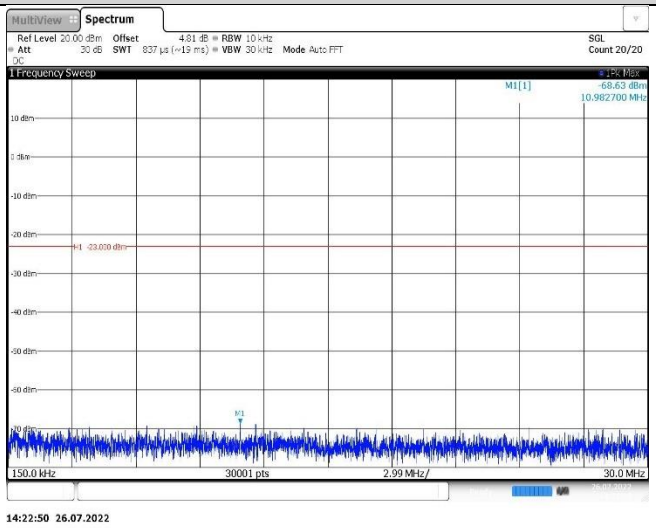
Band2-9538-4-1000~20000MHz



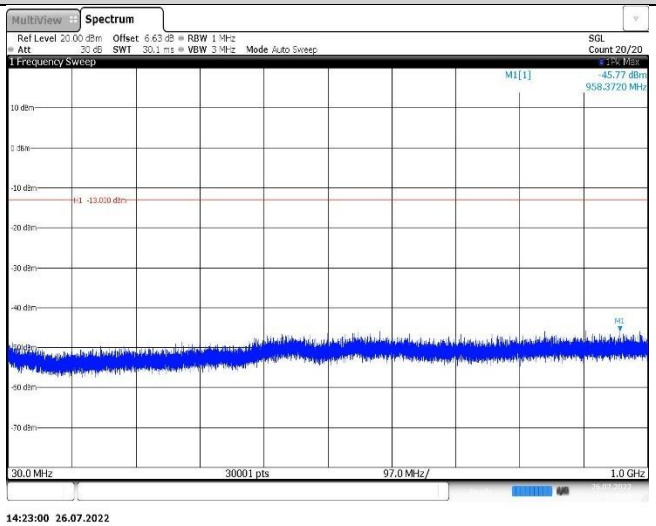
Band2-9538-4-0.009~0.15MHz



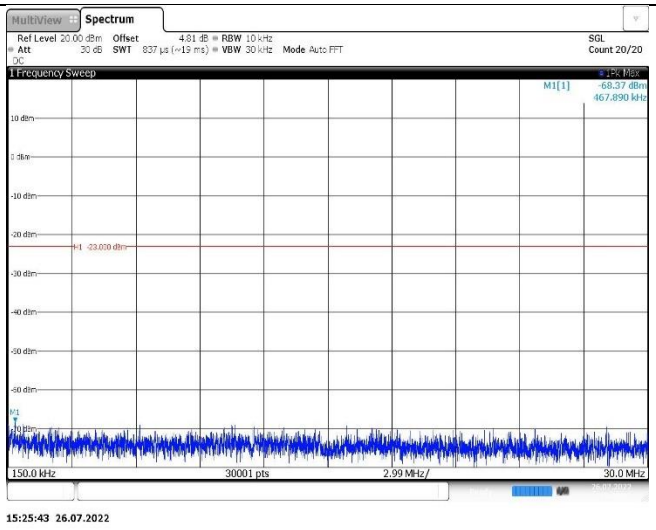
Band2-9538-4-0.15~30MHz



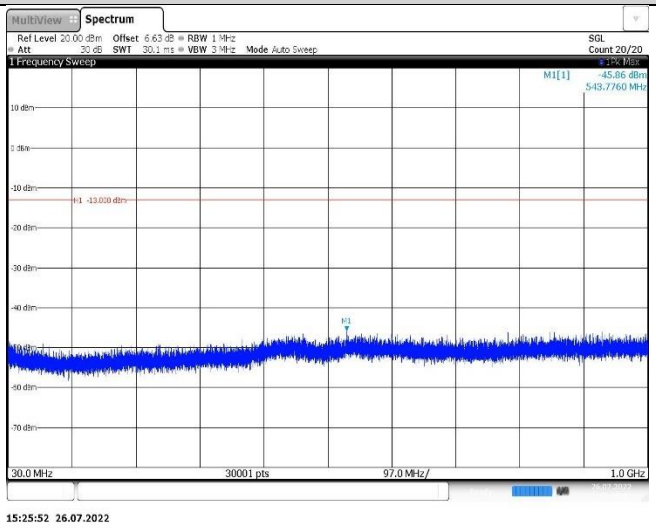
Band2-9538-4-30~1000MHz



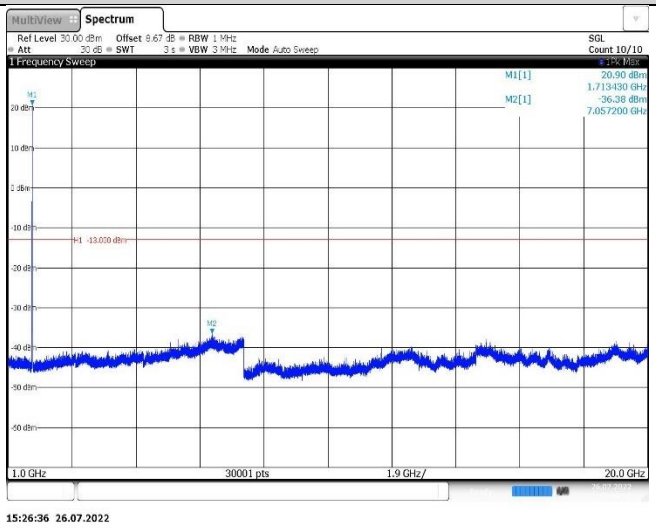
Band4-1312-4-0.15~30MHz



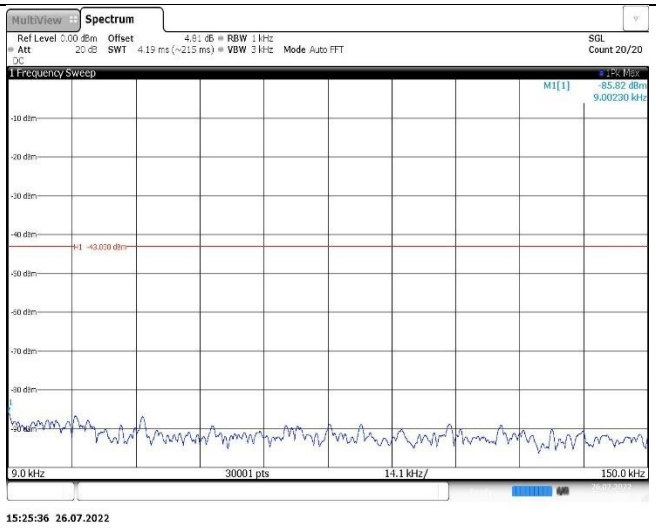
Band4-1312-4-30~1000MHz



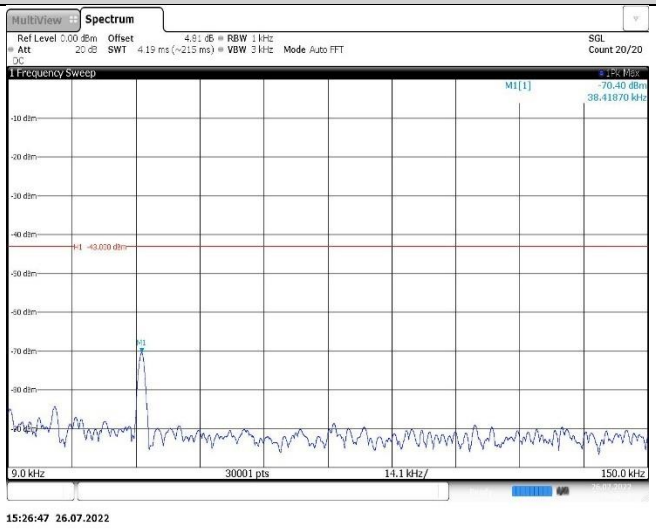
Band4-1312-4-1000~20000MHz



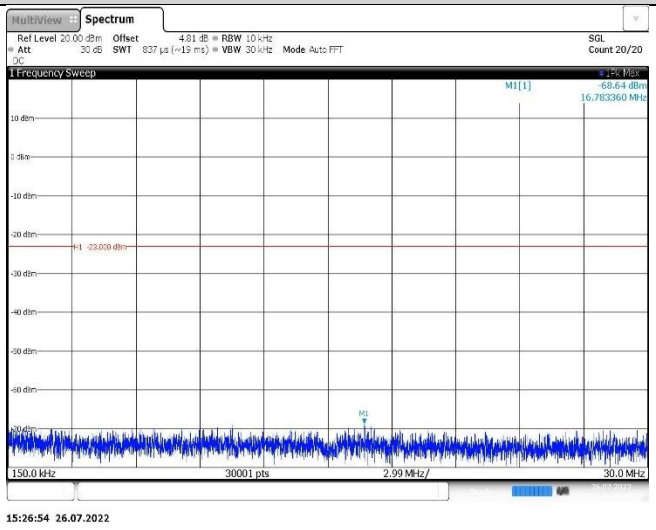
Band4-1312-4-0.009~0.15MHz



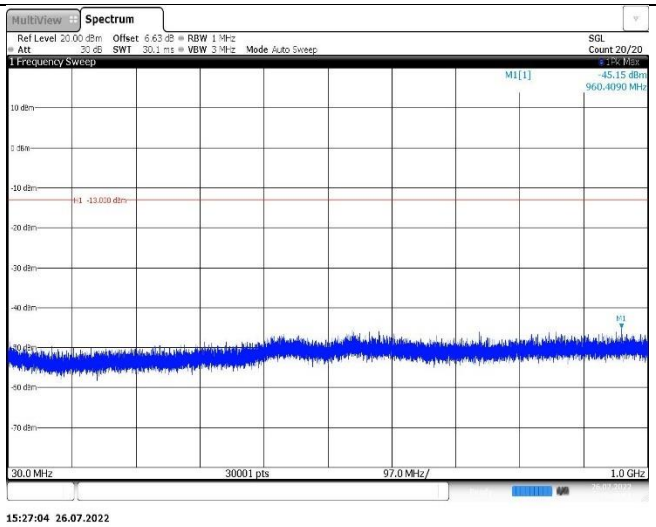
Band4-1413-4-0.009~0.15MHz



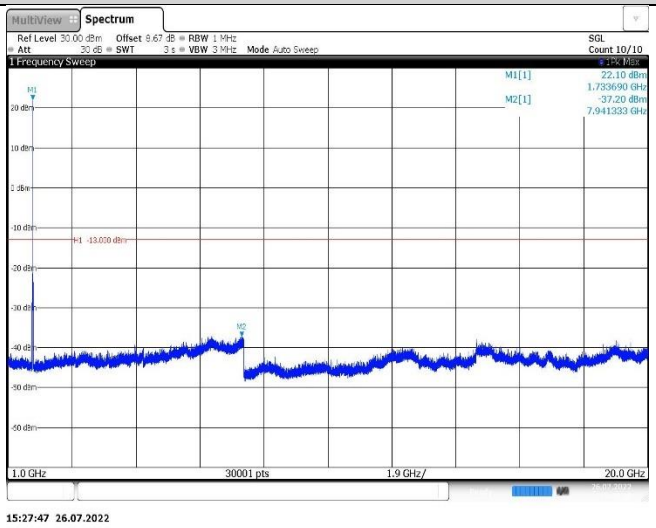
Band4-1413-4-0.15~30MHz



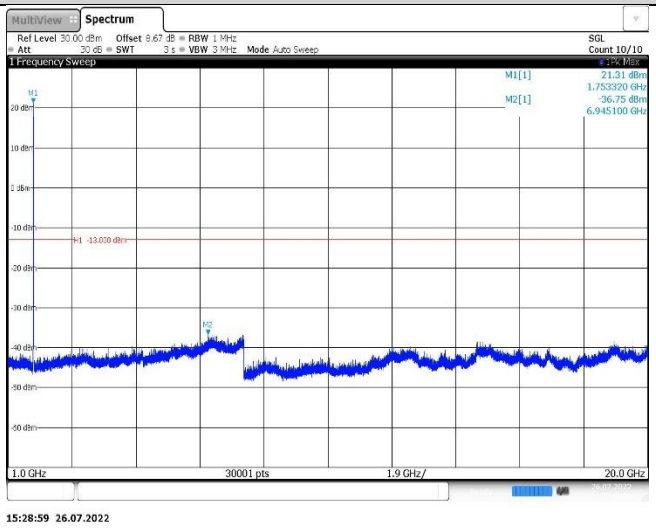
Band4-1413-4-30~1000MHz



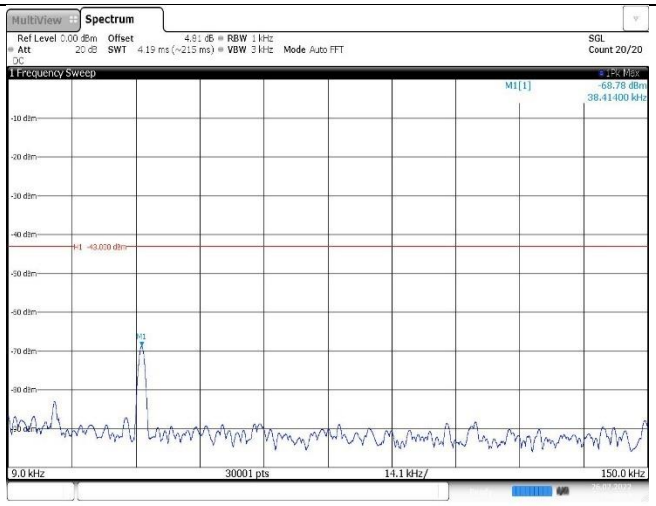
Band4-1413-4-1000~20000MHz



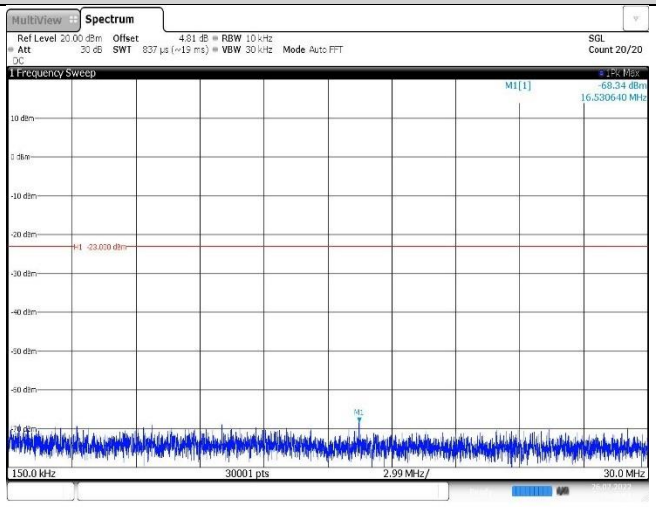
Band4-1513-4-1000~20000MHz



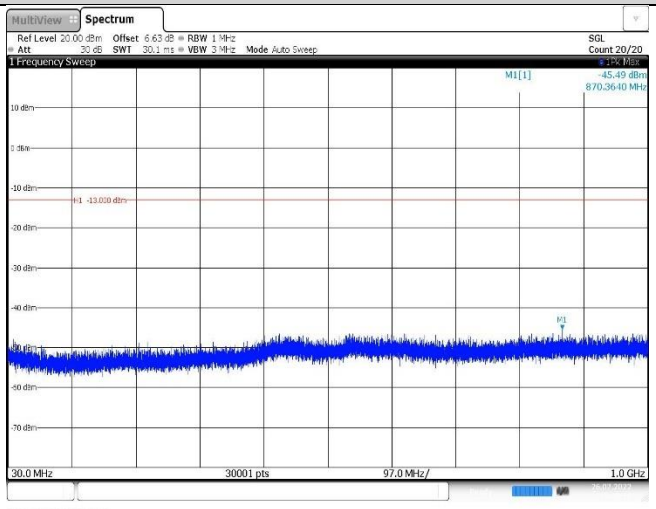
Band4-1513-4-0.009~0.15MHz



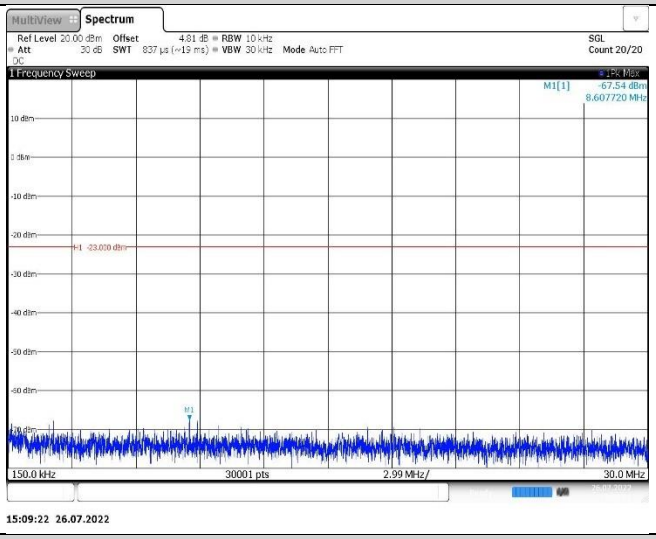
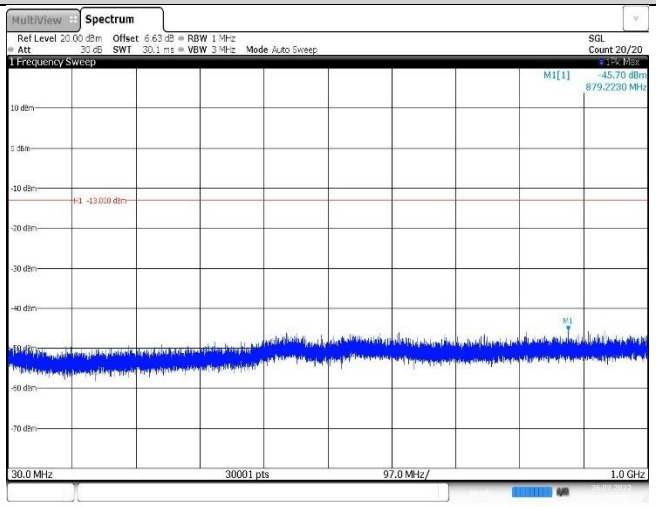
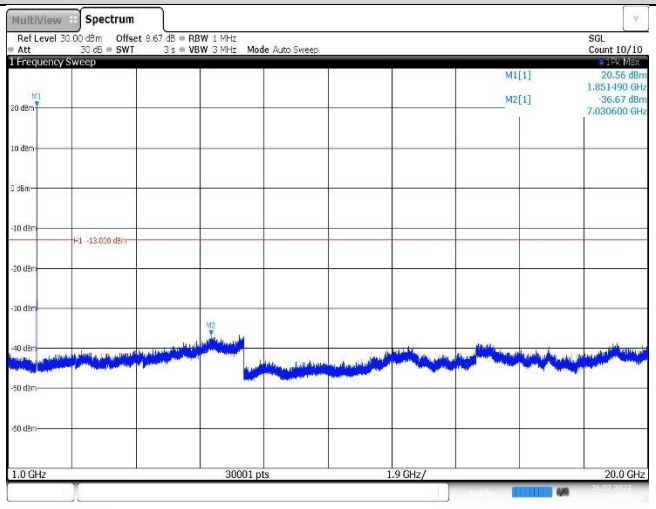
Band4-1513-4-0.15~30MHz



Band4-1513-4-30~1000MHz



HSUPA

Band2-9262-5-0.15~30MHz

Band2-9262-5-30~1000MHz

Band2-9262-5-1000~20000MHz


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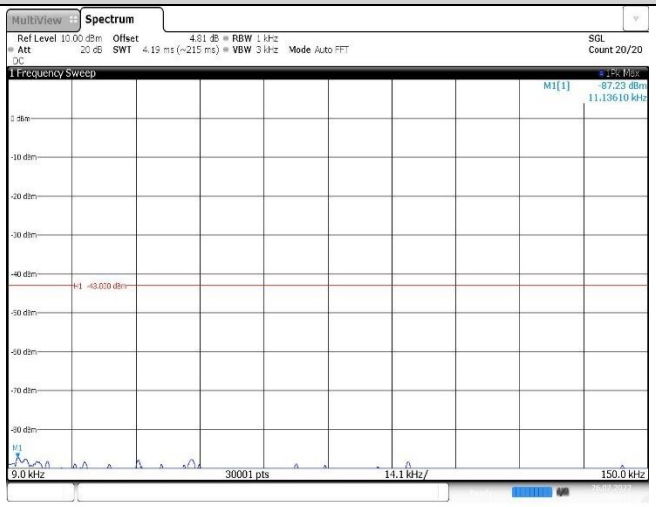
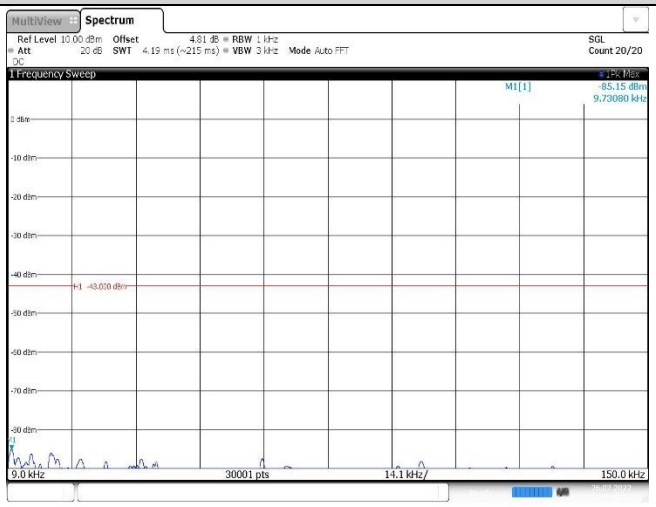
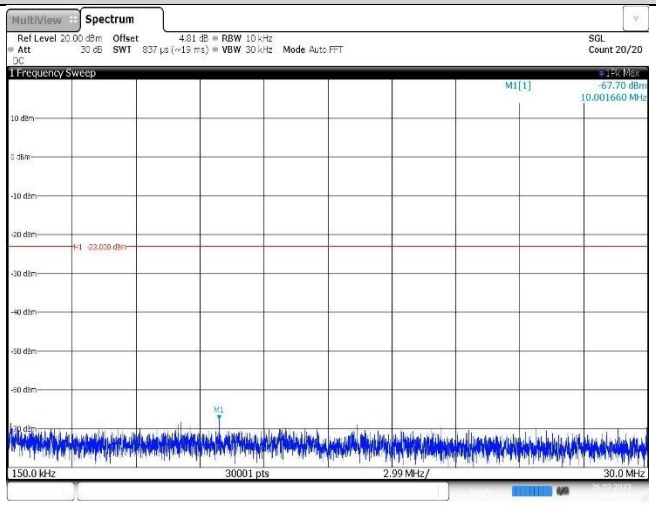
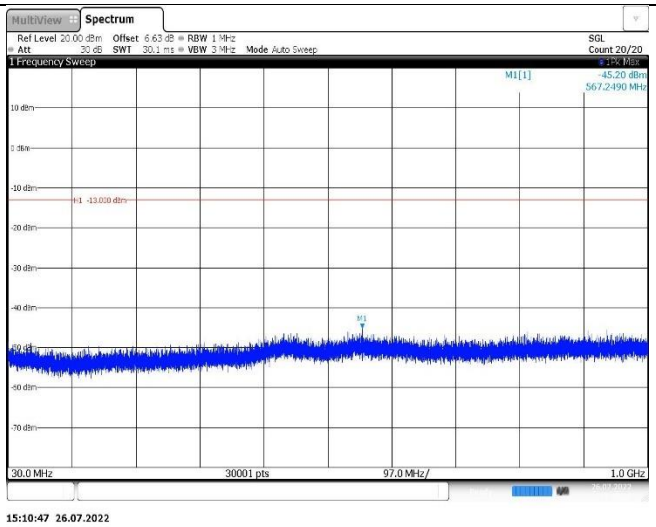
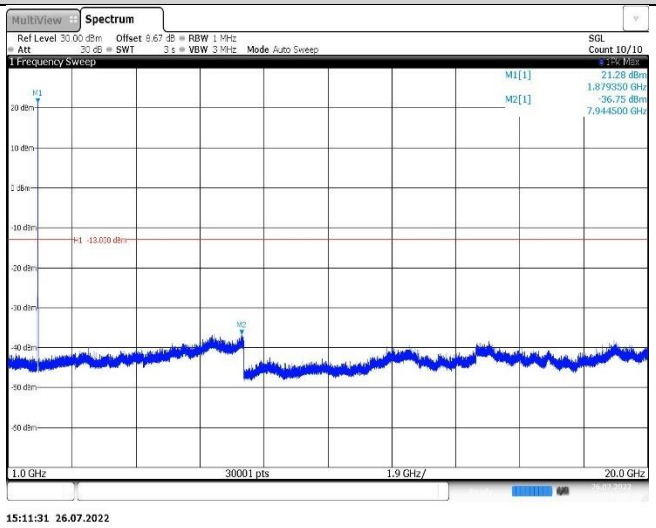
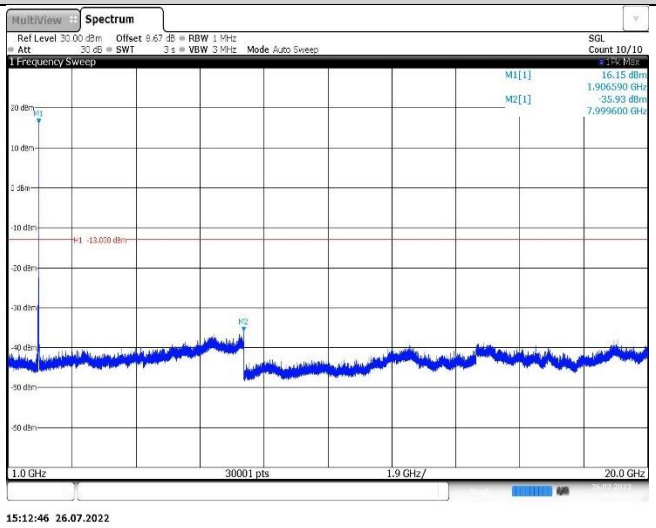

Band2-9400-5-0.009~0.15MHz

Band2-9400-5-0.15~30MHz

Band2-9400-5-30~1000MHz



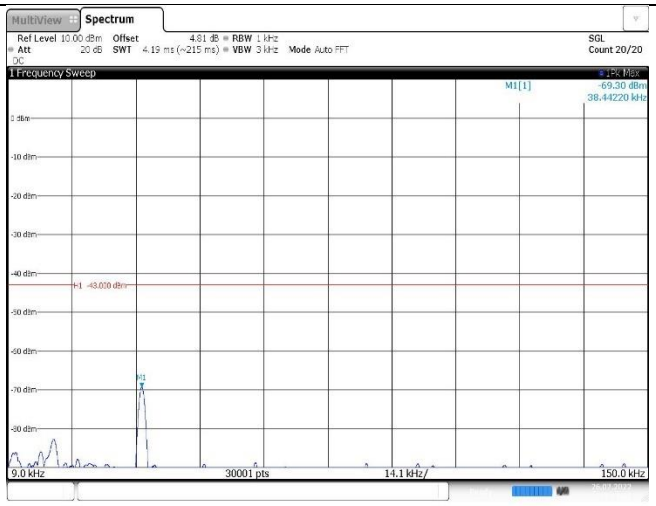
Band2-9400-5-1000~20000MHz



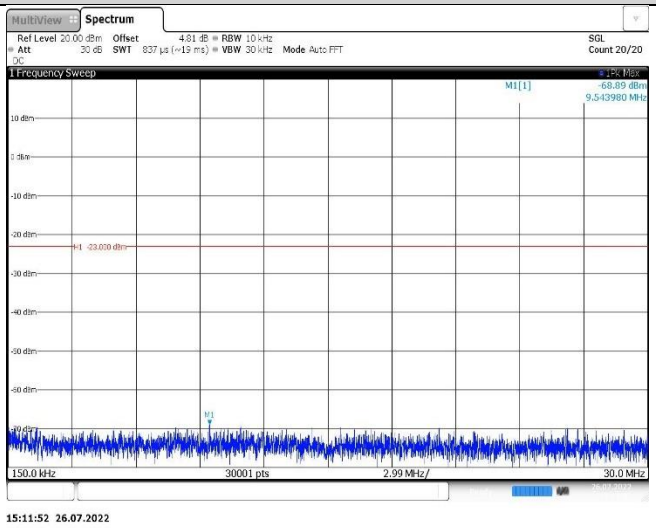
Band2-9538-5-1000~20000MHz



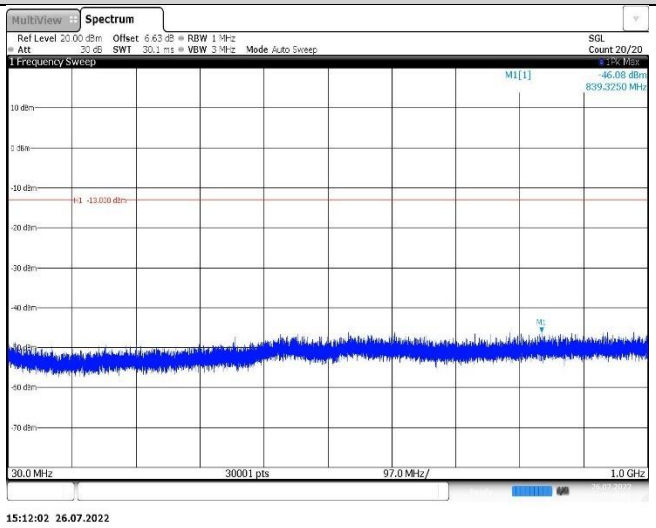
Band2-9538-5-0.009~0.15MHz



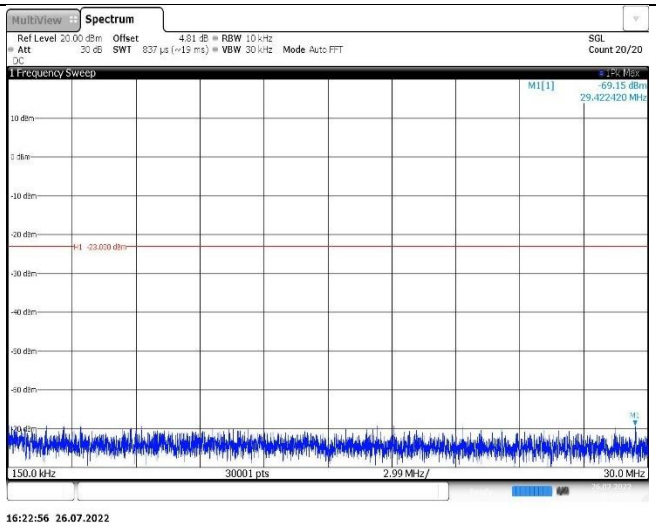
Band2-9538-5-0.15~30MHz



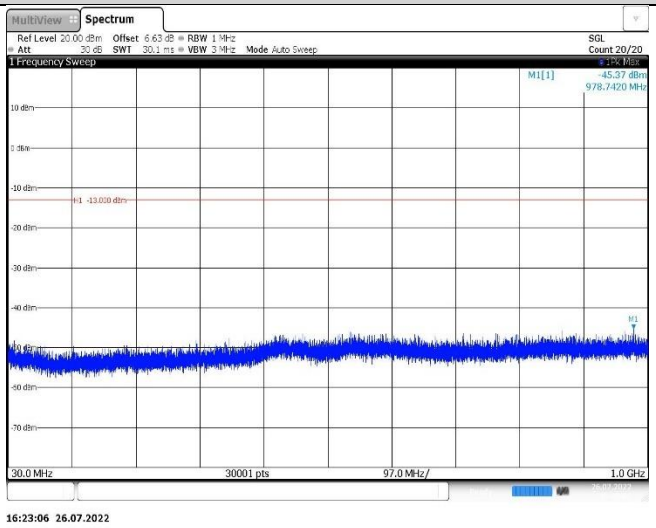
Band2-9538-5-30~1000MHz



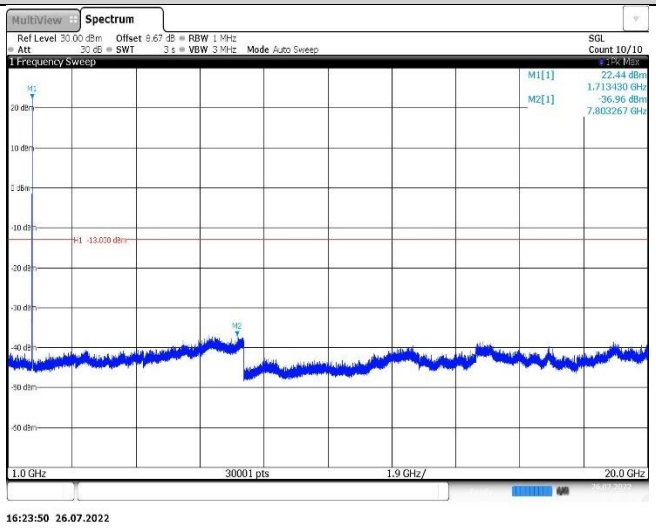
Band4-1312-5-0.15~30MHz



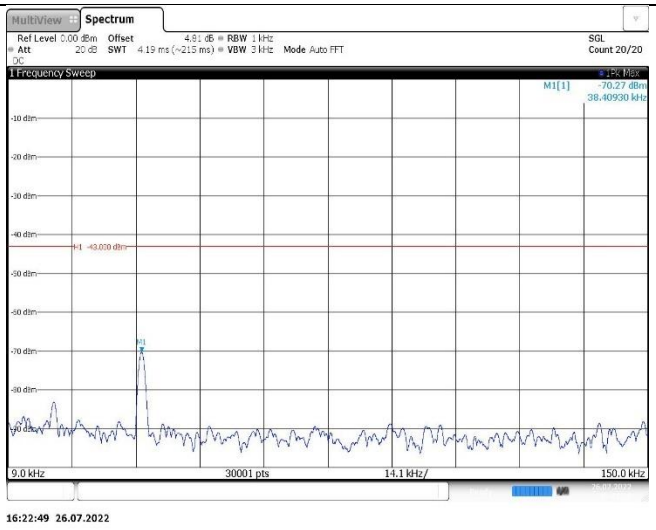
Band4-1312-5-30~1000MHz



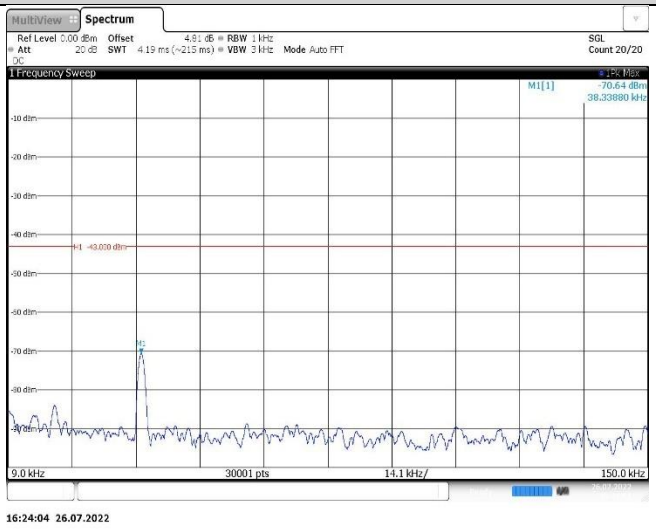
Band4-1312-5-1000~20000MHz



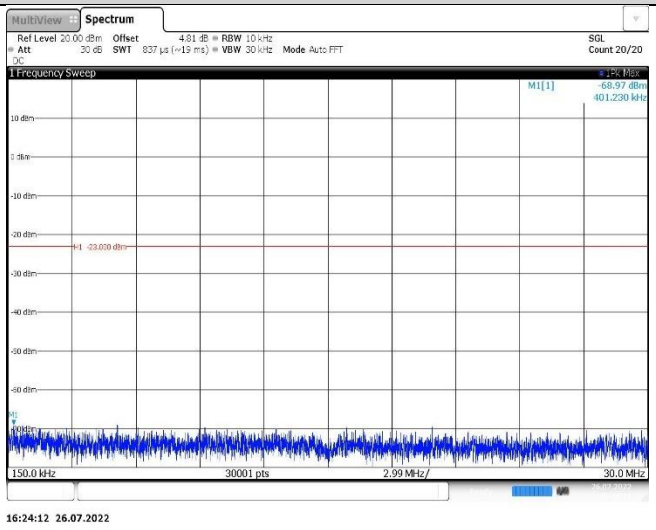
Band4-1312-5-0.009~0.15MHz



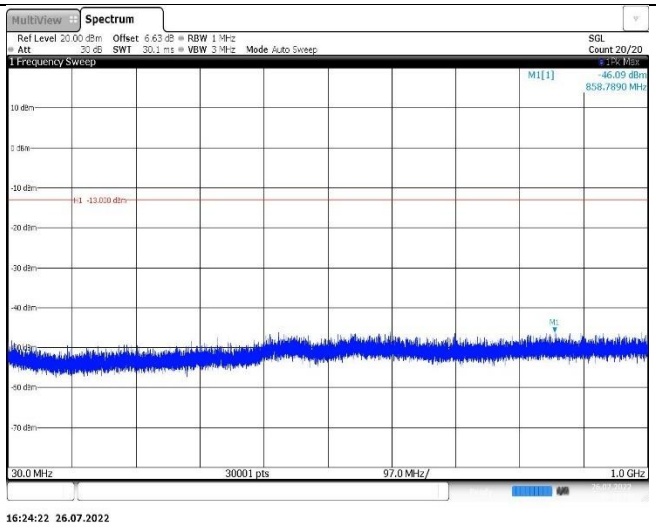
Band4-1413-5-0.009~0.15MHz



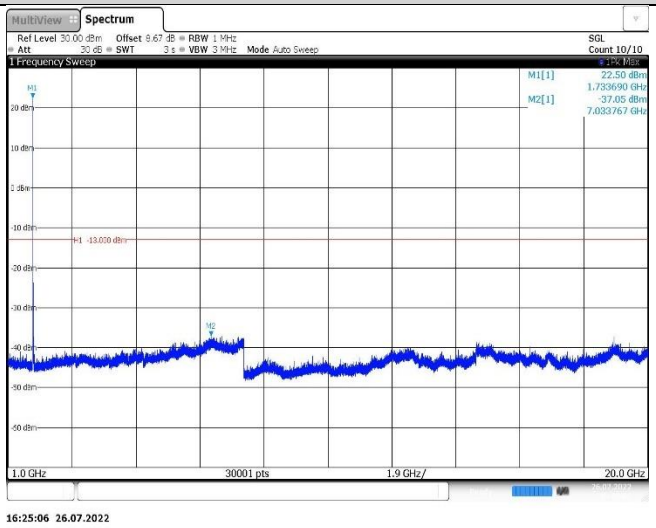
Band4-1413-5-0.15~30MHz



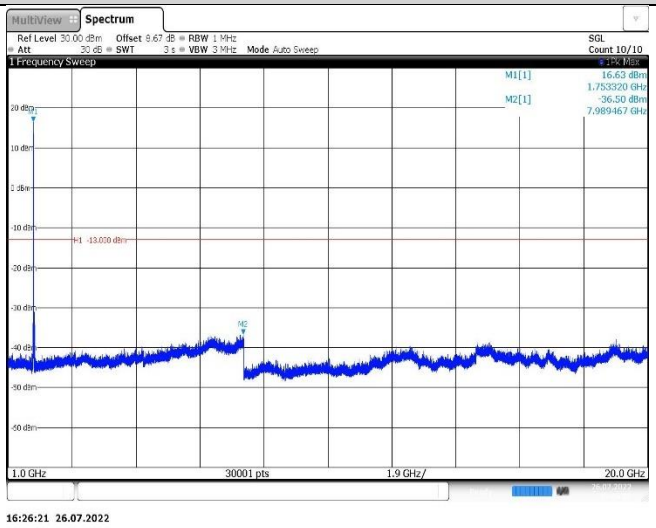
Band4-1413-5-30~1000MHz



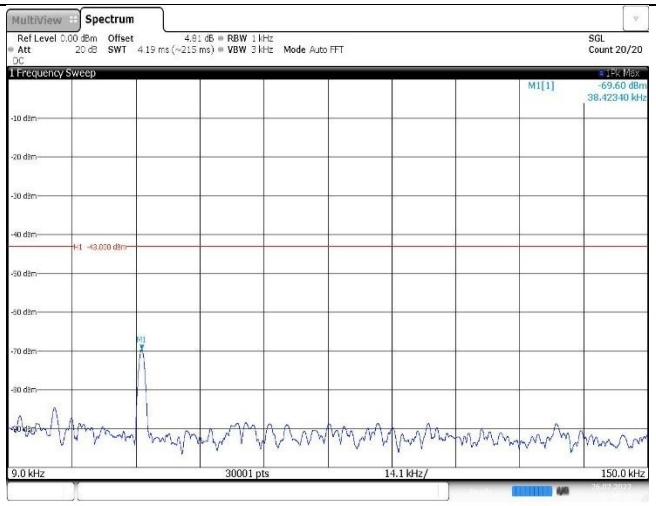
Band4-1413-5-1000~20000MHz



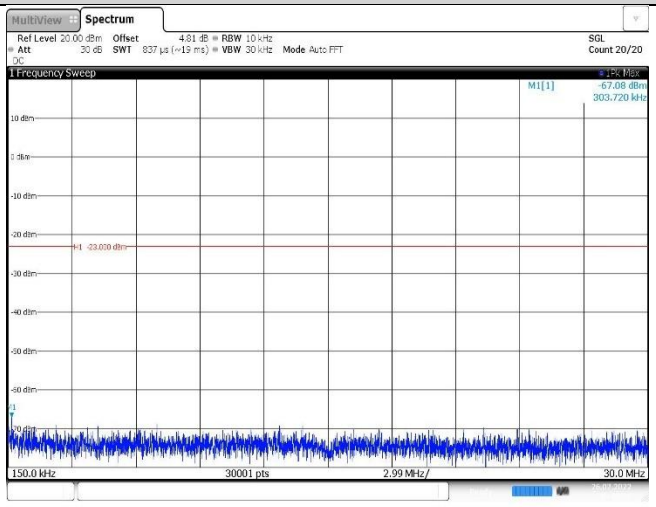
Band4-1513-5-1000~20000MHz



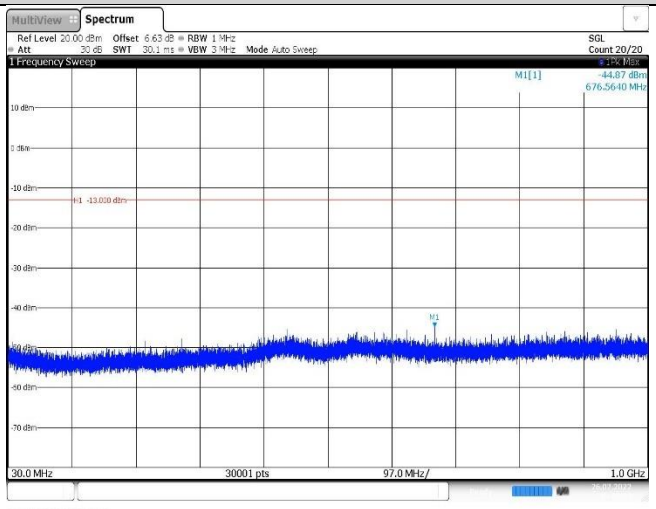
Band4-1513-5-0.009~0.15MHz



Band4-1513-5-0.15~30MHz



Band4-1513-5-30~1000MHz



7.6. FREQUENCY STABILITY

Rule Part:
FCC: §2.1055, §22.355, §24.235, §27.54, §90,
RSS-132, RSS-133,RSS-139

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

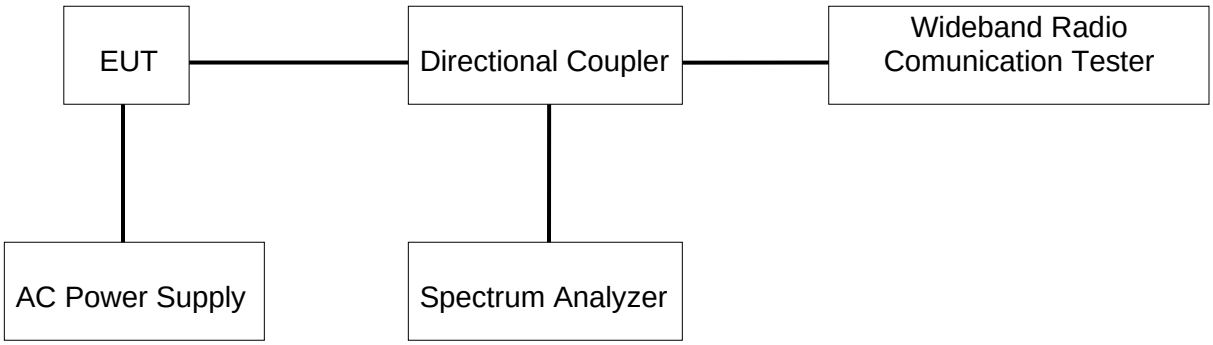
§24.235 and §27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

	Normal Test Conditions	Extreme Test Conditions
Relative Humidity	45 % - 75 %	/
Atmospheric Pressure	100 kPa ~102 kPa	/
Temperature	T_N (Normal Temperature): 24.5 °C	T_L (Low Temperature): -30 °C
		T_H (High Temperature): 50 °C
Supply Voltage	V_N (Normal Voltage): DC 5.8 V	V_L (Low Voltage): DC 4.93V
		V_H (High Voltage): DC 6.67 V

TEST SETUP



TEST ENVIRONMENT

Temperature	23.1°C	Relative Humidity	66.3%
Atmosphere Pressure	101kPa	Test Voltage	/

RESULTS

EGPRS850

Limit		824	849	Delta(Hz)	Frequency Stability (ppm)
Condition		F low@ -13dBm(MHz)	F High@ -13dBm(MHz)		
Temperature	Voltage				
Normal 20℃	Normal	824.02	848.96		
Extreme (-30℃)		824.02	848.96	28.96	0.034616
Extreme (-20℃)		824.02	848.96	27.70	0.033110
Extreme (-10℃)		824.02	848.96	27.83	0.033266
Extreme (0℃)		824.02	848.96	26.60	0.031795
Extreme (10℃)		824.02	848.96	26.28	0.031413
Extreme (30℃)		824.02	848.96	26.41	0.031568
Extreme (40℃)		824.02	848.96	26.76	0.031987
Extreme (50℃)		824.02	848.96	26.64	0.031843
20℃	15%	824.02	848.96	29.12	0.034808
	-15%	824.02	848.96	30.99	0.037043
	End Point	824.02	848.96	29.41	0.035154

EGPRS1900

Limit		1850	1910	Delta(Hz)	Frequency Stability (ppm)
Condition		F low@ -13dBm(MHz)	F High@ -13dBm(MHz)		
Temperature	Voltage				
Normal 20℃	Normal	1850.05	1909.92		
Extreme (-30℃)		1850.05	1909.92	17.56	0.009340
Extreme (-20℃)		1850.05	1909.92	16.53	0.008793
Extreme (-10℃)		1850.05	1909.92	15.11	0.008037
Extreme (0℃)		1850.05	1909.92	15.69	0.008346
Extreme (10℃)		1850.05	1909.92	14.95	0.007952
Extreme (30℃)		1850.05	1909.92	14.43	0.007676
Extreme (40℃)		1850.05	1909.92	15.98	0.008500
Extreme (50℃)		1850.05	1909.92	14.50	0.007713
20℃	15%	1850.05	1909.92	15.11	0.008037
	-15%	1850.05	1909.92	15.85	0.008431
	End Point	1850.05	1909.92	19.76	0.010511

WCDMA

HSDPA Band 2

Limit		1850	1910	Delta(Hz)	Frequency Stability (ppm)
Condition		F low@ -13dBm(MHz)	F High@ -13dBm(MHz)		
Temperature	Voltage				
Normal (20℃)	Normal	1850.11	1909.90		
Extreme (-30℃)		1850.11	1909.90	-1.11	-0.000590
Extreme (-20℃)		1850.11	1909.90	-0.80	-0.000426
Extreme (-10℃)		1850.11	1909.90	-0.87	-0.000463
Extreme (0℃)		1850.11	1909.90	-1.03	-0.000548
Extreme (10℃)		1850.11	1909.90	-0.54	-0.000287
Extreme (30℃)		1850.11	1909.90	-0.54	-0.000287
Extreme (40℃)		1850.11	1909.90	-0.40	-0.000213
Extreme (50℃)		1850.11	1909.90	-0.44	-0.000234
20℃	15%	1850.11	1909.90	-1.31	-0.000697
	-15%	1850.11	1909.90	-1.69	-0.000899
	End Point	1850.11	1909.90	-1.61	-0.000856

HSDPA Band 4

Limit		1710	1755	Delta(Hz)	Frequency Stability (ppm)
Condition		F low@ -13dBm(MHz)	F High@ -13dBm(MHz)		
Temperature	Voltage				
Extreme (20℃)	Normal	1710.09	1754.94		
Extreme (-30℃)		1710.09	1754.94	-0.18	-0.000104
Extreme (-20℃)		1710.09	1754.94	-0.51	-0.000294
Extreme (-10℃)		1710.09	1754.94	-0.01	-0.000006
Extreme (0℃)		1710.09	1754.94	0.08	0.000046
Extreme (10℃)		1710.09	1754.94	-0.02	-0.000012
Extreme (30℃)		1710.09	1754.94	-0.74	-0.000427
Extreme (40℃)		1710.09	1754.94	0.36	0.000208
Extreme (50℃)		1710.09	1754.94	-0.21	-0.000121
20℃	15%	1710.09	1754.94	-0.09	-0.000052
	-15%	1710.09	1754.94	-0.64	-0.000369
	End Point	1710.09	1754.94	-0.76	-0.000439

8. RADIATED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, §27.53, §90,

LIMIT

Part §22.917(a), §24.238(a), §27.53(h)
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

RSS-132 section 5.5
Mobile and base station equipment shall comply with the limits in (i) and (ii) below.
(i) In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).
(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

RSS-133 section 6.5.1
Equipment shall comply with the limits in (i) and (ii) below.
(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

RSS-139 section 6.6
(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

TEST PROCEDURE

According to the C 63.26-2015 section 5.5.2.2.3

Below 1GHz test procedure as below:

For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80 cm above the reference ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e., field strength or received power). When orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25 cm.

Above 1GHz test procedure as below:
For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table or support at a nominal height of 1.5 m above the ground plane. Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The height scan of the measurement antenna shall be varied from 1 m to 4 m in a search for the relative positioning that produces the maximum radiated signal level (i.e., field strength or received power). When using the direct field strength method and the EUT is manipulated through three different orientations, then the scan height range of the measurement antenna is limited to 2.5 m, or 0.5 m above the top of the EUT, whichever is higher.

Radiated Power Measurement Calculation According to ANSI C63.26-2015

a) E (dBµV/m) = Measured amplitude level (dBµV) + Cable Loss (dB) + Antenna Factor (dB/m).
b) E (dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m).
c) E (dBµV/m) = EIRP (dBm) − 20log(D) + 104.8; where D is the measurement distance (in the far field region) in m.
d) EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m.
So, from d)
The measuring distance is usually at 3m, then 20*Log(3)=9.5424
Then, EIRP (dBm) = E (dBµV/m) + 9.5424 − 104.8 = E (dBµV/m) – 95.2576

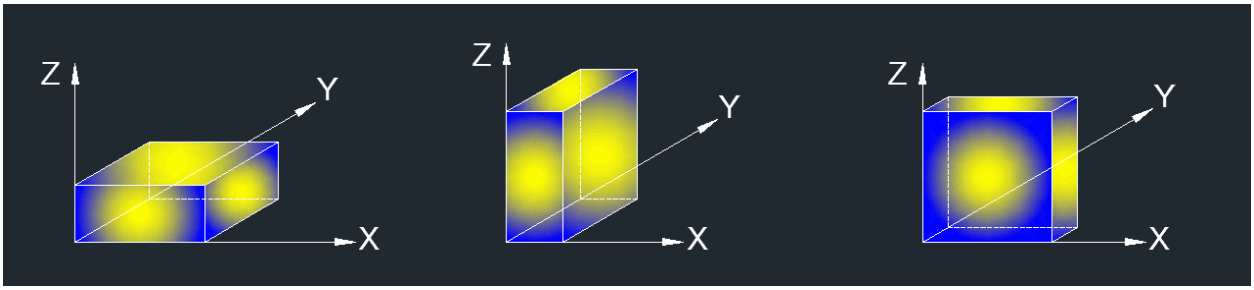
The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

EIRP[dBm] =E[dBµV/m] − 95.2
E[dBµV/m]= 95.2+ EIRP[dBm]
E[dBµV/m]= 82.20

NOTE 1: Radiated spurious emissions were investigated below 30 MHz, 30 MHz – 1 GHz and above 1 GHz. There were no emissions found on below 30 MHz and 30 MHz – 1 GHz. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

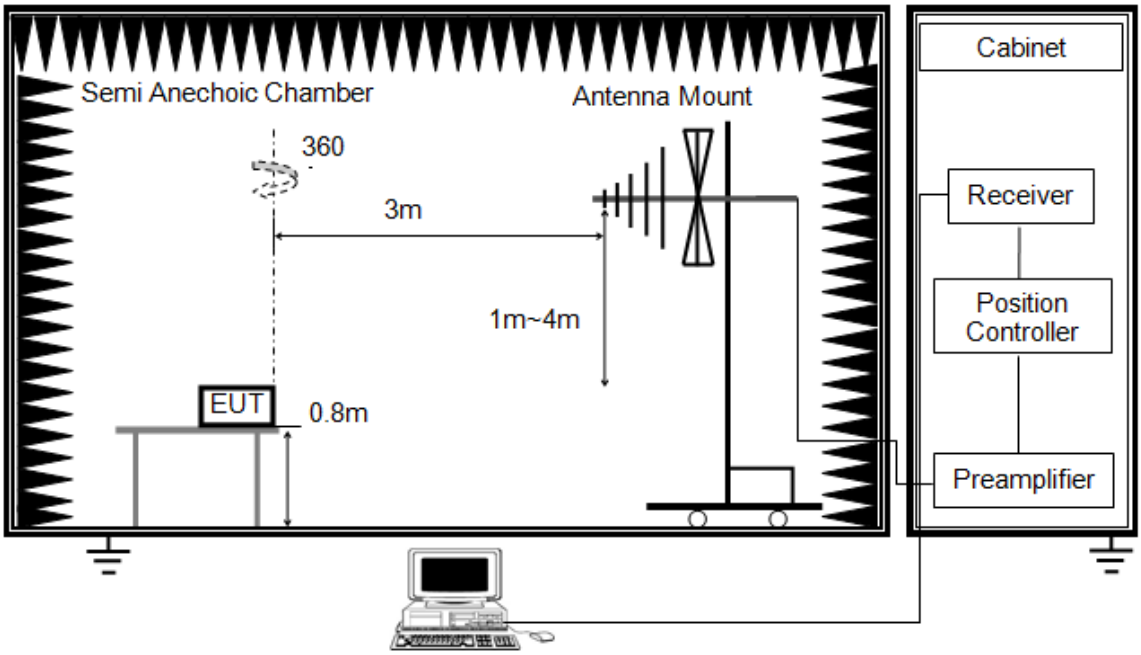
NOTE 2: Please refer to section 5.4 for bandwidth and RB setting about LTE bands.
NOTE 3: All the test modes have been tested, only the worst data record in the report.

Note 4: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.
X axis, Y axis, Z axis positions:

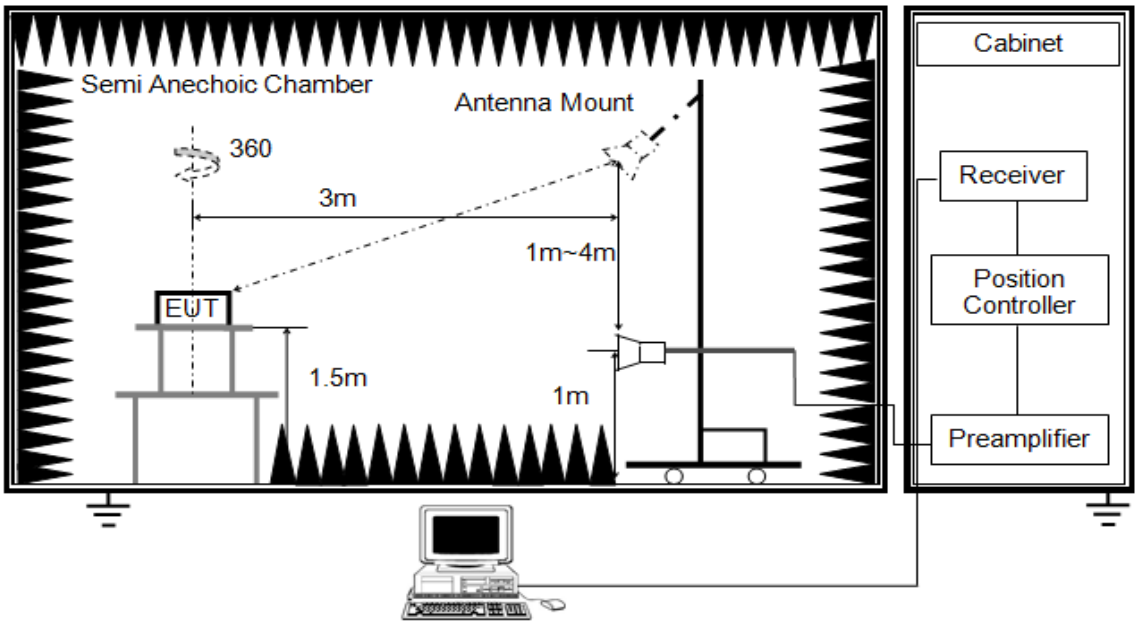


TEST SETUP

Test Setup for Below 1 GHz



Test Setup for Above 1 GHz



TEST ENVIRONMENT

Temperature	24.3°C	Relative Humidity	61%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.8 V

RESULTS

GSM 850
GPRS- Low Channel- Horizontal

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1378.000	52.38	-13.27	39.11	82.25	-43.14	peak
2026.000	51.44	-10.92	40.52	82.25	-41.73	peak
3529.000	49.69	-5.77	43.92	82.25	-38.33	peak
7174.000	37.78	6.02	43.80	82.25	-38.45	peak
8128.000	39.77	5.80	45.57	82.25	-36.68	peak
9145.000	37.39	9.80	47.19	82.25	-35.06	peak

GPRS- Low Channel- Vertical

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1162.000	57.07	-14.28	42.79	82.25	-39.46	peak
1675.000	57.93	-12.13	45.80	82.25	-36.45	peak
2494.000	50.12	-8.52	41.60	82.25	-40.65	peak
3655.000	45.23	-5.43	39.80	82.25	-42.45	peak
7759.000	38.96	5.67	44.63	82.25	-37.62	peak
9154.000	37.42	9.80	47.22	82.25	-35.03	peak

GPRS- Mid Channel- Horizontal