File Number: 0932-EX-CN-2022

August 22, 2022

<u>Compliance of equipment RN-530 with ITU Resolution 243 OOBE Limits as</u> requested by NASA.

ITU Res 243 OOBE limits requested by NASA:

Frequency band for the EESS (passive)	Frequency band for IMT stations	Unwanted emission mean power for IMT stations ¹	Recommended limits for IMT stations ¹		
36-37 GHz	37-40.5 GHz	-43 dB(W/MHz) and -23 dB(W/GHz) within the frequency band 36-37 GHz	-30 dB(W/GHz)		

The unwanted emission power level is considered in terms of total radiated power (TRP). The TRP is to be understood here as the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere.

Below data is from the DVT (Design Verification Test) of the radio as done by the Qualcomm tools.



GNB_TxOBUE

Status: PASS

Meas Delay (ms)	Gain	SEM Category (A/B)	SEM Limit Type (Absolute/Relative)	Enable Temp Verification?	Target Tx Power (dBm)	DL Waveform	Tx Beam ID	Aug. Thermistor Temperature (C)	Time (s)
2000	0	CAT-A	Absolute	No	45.5	GNB_TM1.1	11	41.125	23.14
2000	0.	CAT-B	Absolute	No	45.5	GNB_TW1.1	11	41.5125	24.70
2000	0.	CAT-A	Absolute	No	45.5	GNB_TM1.1	11	42 125	23.06
2000	0.	CAT-B	Absolute	No.	45.5	GNB_TM1.1	11	42.25	25.41
2000	0.	CAT-A	Absolute	No	45.5	GNB_TW1.1.	11	43.5625	22.95
2000	0.	CAT-B	Absolute	No	45.5	GNB TWILT	11.	43.8125	25.47
2000	0.	CAT-A	Absolute	No	45.5	GNB_TWILT	139	43.875	23.52
2000	0	CAT-B	Absolute	No	45.5	GNB_TM1.1	139	43.9375	25.47
2000	0	CATA	Absolute	No	45.5	GNB_TM1.1	139	44.1875	22.64
2000	0	CAT-B	Absolute	No	45.5	GNB TM1.1	139	44.1875	25.47
2000	0	CAT-A	Absolute	No	45.5	GNB_TM1.1	130	45.0625	23.27
2000	. 0	CAT-B	Absolute	No	45.5	GNB_TM1.1	139	45.0625	24.53

OBUE Details

DL Deec	Tx Beare ID	DL Freq (MHz)	SEM Category (A/B)	Mask	SEM Start Frequency (Strict)	SEM Stop Frequency (MHz)	MeasilW (MHz)	SESS Offices Manging Lawre (1983)	SEM Offset Margin Limit Min	Three (16)
Cert)_PR2_DL_100941z_GP5K_Channel_2234900_TargetFoxes=45.565m	11	37350 00: 37449.95 ,37549.92	CAT-A	-2	-40.5	-1706.98	1	12.6412	0	
Card_FR2_DL_100M-Iz_GP9K_Channel_2234999_TargetPower=85.648m	.11	37560.00 37449.96 37549.92 37949.66	CATA	4:	-01	-40.5	10	29.0626	0	
Card_FR3_DL_100Mrs_GP5K_Channel_2234999_TargetPower-45.5dBm	-11	37360 00 37449 96 37549 92 37849 88	CAT-A	1	0.5	40.5	- 1	22.1716	0	
Cart) FR2_DL_100Mr2_GP9K_Channer_2234996_TargetPower=46.598m	ा	37360.00 37449.96 37549.92 37549.88	CATA	2	40.6	3800.08	11	12.9621	0.5	
Card_FR3_DL_100684z_QPSK_ChanseL2034996_fargetPower+65.5d8m	71	37560.00 ,37449.96 ,37649.92 37549.88	CAT-B	3	-806	1709.98	10	24,976	0	
Card_FR2_DL_100Mrs_GP5K_Channel_2234900_TargetPower=6.5e8m	31	37360.00 37449.90 37549.92 37949.68	C47-8	2	-40.9	-800.5	1	12.5276	9	
Card, FR2_DL_1006Ft_GPSK_Channel_2234996_TargetPower=65.568m	- 11	37580 00 37449 96 37549 93 37549 68	CAFB	4	-05	40.6	1	22.8637	0	
Cert)_FR2_DL_10064s_GPSK_Chennel_2234996_TargetPower+46.5d8m	91	37362:00 37449:90 37649:92 37940:68	CAT-B	8.	35	40.5	+	22 1474	00	
Carri)_FR2_DL_10084-b_GPSK_Channel_2234996_TargetPower=46.5elsen	-11	37350 00 37449 96 37549 92 37949 88	CW-8	2.5	40.5	800.6	1.	12:2541	0	
Cart), FR2_DL_10064-b_QP5K_Charvel_2234999_TargesPower=45.5dRm		37560.00 37449.96 37549.90 37549.68	CAT-B	3	805	3800.08	10	16.7359	ů.	
Card_FR2_DL_100661z_GFSK_Channel_2251007_TargetFower145.568in	11	36360-00-30450-04-38560-00 38640-96	CAF-A	2	-40.5	-3800-06	1	10.8902	0	
Carti PR2_DL_1009Ats_CP5K_Channel_2251957_TargetFower=65-598m	11	36350 00 36450 04 36550 00 38640 96	CAT-A	-4	-0.5	-40.5	9	21,2980	0	
Card_FR0_DL_100h84c_GPSK_Channel_2261907_TargetFower145.5d8m	:11	36060 00 36460 04 36660 00 36640 96	CATA .	3.1	0.6	40.5	11	21 5804	0.	
Card_FRZ_DL_1009Atz_QFSK_Channel_2251967_farged*over+45.5eBm	11	39250 00 30450 04 39550 00 39949 96	CAT-A	2	40.0	2800	1.	11.4951	0	
Cart) FR2_DL_10064-2_GPSK_Chorvet_2261967_TargetPower=46.6d8m	ा	38360:06:38450:04:38560:00 38649:98	047-8	- 3	806	-2900.06	10	24.2917	0	
Cert.JRQ_DL_100M/s_QPSK_Chernel_2251967_TergelPower+45.5dBm	**	36160 06 30450 04 36550 00 38449 98	CAT-B	-2	-40.5	-000.5	4.	10.0139	0	
Card_FRQ_DL_100MHz_GP6K_Chansel_2261667_TargetPower=46.668m	11	36360 06 35450 04 36660 00 36649 56	CAT-B	.3	-0.5	-40.5	1	212909	0	
CavO_FRO_DL_100hl-lz_QPSK_Channel_2251997_TargetPower=65.5dRm	- #	36360.06.36460.04.38560.00 38549.96	CAF-B	1	0.5	40.5	1	21.043	0	
Card, FR2_DL_100649_GFSK_Overnel_2251987_TargetPover+46.568m	- 11	36360-06 38450-04 38650-00	C41-8	2	40.5	800.5	1	11.014	- 0	

Card_FR2_DL_100VHz_GP5K_Channel_2251687_TargetPower=45.5d9re	11	38350.08,38450.04,38550.00 38849.90	CAT-8	3	806	2800	10	19.2924	. 0
Card_FR2_DL_100MHz_GPSK_Channel_3260333_TargetPower=45.5dBm	11:	38350.04.39450.90.38549.98 38649.92	CATA	- 2	-40.5	-3600 EQ		8 15507	0
Card, FR2_DL_100WHz_QPSK_Channel_2000333_TargetPower165.5dRe	#1	38350.04 30450.00 39549.96 39549.90	CATA	4	-0.6	40.5	71	19/8818	0
Card_FR2_DL_100MHz_GPSK_Channel_2268333_TagetPower=45.5dBre	11	38350.04 30450.00 39549.98 30649.92	CAT-A	1	0.6	40.5	1.9	21.1073	0
Card_FR2_DL_100MHz_GP5K_Channel_2250333_TargetPower=45.5dRm	11	39350.04.30450.00.39549.96 39640.02	CATA	2	40.5	1800.04	1	10 9467	0
Card_FR2_DL_100MHz_GP5K_Channel_2260333_TargetPower=45.5dbn	11	38350 04 39450 00 39549 96 39649 02	CAT-8	-3	-805	-3600.02	10	23.0238	.0
Card, FR2_DL_100Mrs_CPSK_Channel_2200333_TargetFoxer=45.5dbm	11.	39350 04 39450 00 39546 BE 39649 92	CAY-8	-2	-40.5	-806.5	-1	8.77824	0
Card_FR2_DL_100MHz_QPSK_Chansel_2260333_TargetPower=45.5dBre	11	38350 04 30450 00 39549 96 39649 92	CAY-8	40	-0.9	-40.6	7.3	19.8343	. 0
Card, FR2_DL_100MHz_QPSK_Channel_2200303_TargetPover=85.5dSm	11.	38390 04 39450 00 39549 86 39649 90	CAT-B	1	0.5	40.5	1	21.124	0
Card_FR2_Dt100MHz_GPSK_Channel_2200333_TargetPover=45.5dRe	71	38950.04 30450.00 39549.98 39649.90	CAT-9	2	40.5	800.5	11	10.068	.0
Cord_FR2_DL_100Mits_QPSK_Channel_2000000_TargetPower=65.5dBm	11.	58350.04.39450.00.39549.96 35640.90	CAT-B	3	806	1800.04	10	13.9973	0
Card_FR2_DL_1006Ftz_QP5K_Channel_2234699_TargetPower=45.5dRns	139	37350.00 37449.90 37549.92 37540.00	CATA	-9	-40.5	-1790 38	1	11.3012	0
and_FR2_DL_100MHz_QP5K_Channel_2234699_TargetPower=45.5dBm.	139	37350 00 37449 95 37546 50 37549 88	CAT-A	-1	-0.5	40.5	1	22.1649	0
Card, FR2_DL_100MHz_GP5K_Channel_2234999_TagetPower=45.5dbm	139	37350 00 ,27449 96 37546 90 37949 98	CATA	1	0.5	40.5	- 11	22.1971	. 0
Card_FR2_DL_100kHs_GP8K_Channel_2234669_TargetPower=45.5d9re	139	37350.00 37449.95 37549.92 37949.88	CAT-A	2	40.5	9800.08	1	12.7476	0
Card, FR2_DL_100MHz_QP8K_Channel_2234599_TargetPover=45.5d8m	138	37350.00 .37449.96 .37549.92 37649.68	CAT-8	-3	-806	-1799.58	10	25.2093	.0
Card_FR2_DL_100MHz_GPSK_Channel_2234669_TargetPower=45.5dbre	139	37350.00 .37449.90 .37549.52 37549.00	CATB	2	-40.5	400.5	1.4	11.1264	0
CarrO_FR2_DL_100KHz_QPSK_Channel_2234699_TargetPower=85.5dRe	138	37350.00 37449.99 37549.82 37549.00	CAT-B	-8	-66	-40.5	1	21.8040	0
Card_FR2_DL_100MHz_QPSK_Channel_225H999_TargetPower=45.5d0m	139	57350.00 37449.96 37549.92 37549.00	CATB	1.	0.5	40.5	- 19	22.258	0
Card_FR2_Di_100kHz_QPSK_Channel_2234609_TargetPower=45.5dRn	139	37350.00 37449.90 37549.60 37549.80	CAT-6	2	40.5	800.5	7	12.612	0
CarrO_FR2_DL_100MHz_GP5K_Channel_2204099_TargetPower=45.5dDm	139	37350.00 37449.95 37549.80 37540.88	CAT-8	3	805	3000.00	10	17.0857	d
Card_FR2_DL_100Mrb_GP5K_Channel_2251667_TargetPower=45.5dbm	129	38350 08 36450 04 38550 00 38849 96	CATA	-2	-405	-2600.06	- 1	9.25844	0
Carr0_FR2_Dt_100MHz_GPSK_Channel_2251667_TargetPower=45.5dBn	139	38350 08:30450 54:38550 08:38649 96	CATA	-1	-0.6	-40.6	- 13	19.8852	.0
Card, FR2_DL_100Mrs_GPSK_Channel_2251667_TargetPover=45.568re	139	38350.08.36450.04.38550.00 38649.96	CATA	1	0.6	40.5	14	20.7406	0
Card_FR2_DL_100MHz_QPSK_Channel_2251667_TarpetPower+45.5dBns	136	38350.06.36450.04.38950.00 38540.96	CATA	2	40.5	2800	19	10 3712	0

Carr0_FR2_DL_100MHz_QP8K_Channel_2251667_TargetPower=45.5d8m	139	38350.08,38450.04,38550.00 ,38649.96	CAT-8	-3	-805	-2800.06	10	24.8618	0	
Carr0_FR2_DL_100WHz_QPSK_Channel_2251667_TargetPower=45.6d8m	139	38350.08 ,38450.04 ,38550.00 ,30649.96	CAT-8	-2	-40.5	-800.5	1	9.31338	0	
Carr0_FR2_DL_100WHz_QPSK_Channel_2251667_TargetPower=45.5d8m	139	38350.08.38450.04.38550.00 30649.95	CAT-B	-4	-0.5	-40.5	1	19.9761	0	
Carr0_FR2_DL_100WHz_QPSK_Channel_2251667_TargetPowerr45.5d8m	139	38350.08.38450.04.38550.00 30649.95	CAT-B	1	0.5	40.5	1	20.0007	0	
CarrO_FR2_DL_100WHz_QPSK_Channel_2251667_TargetPower=45.5dSm	139	38350.09.39450.04.38550.00 38649.95	CAT-B	2	40.5	800.5	1	10.2549	0	
Carr0_FR2_DL_100Whz_QP5K_Channel_2251667_TargetPower=45.5d5m	139	38350 09 38450 04 38550 00 38649 96	CAT-8	3	805	2800	10	20.2068	0	
Carr0_FR2_DL_100MHz_QP8K_Channel_2288333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.95 ,39649.92	CAT-A	-2	-40.5	-3800.02	1	7.44366	0	
Carr0_FR2_DL_100MHz_QP8K_Channel_2298333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.96 ,39649.92	CAT-A	-4	-0.5	-40.6	1	18.2347	0	
Carr0_FR2_DL_100MHz_GP8K_Channel_2298333_TargetPower=45.6d8m	139	30350.04 ,39450.00 ,39549.96 ,39549.92	CAT-A	1	0.5	40.5	1	20.7696	0	
Carr0_FR2_DL_100MHz_QPSK_Channel_2268333_TargetPower+45.5d9m	139	30350.04 ,39450.00 ,36549.96 ,39549.92	CAT-A	2	40.5	1800.04	1	10.5466	0	
Carr0_FR2_DL_100WHz_QPSK_Channel_2260333_TargetPower~45.5dSm	139	39350.04 ,39450.00 ,39549.96 ,39549.92	CAT-B	-3	-805	-3800.02	10	25.5164	0	
Carr0_FR2_DL_100MHz_QP5K_Channel_2268333_TargetPower=45.5d8m	139	39350 04 ,39450 00 ,39549.96 ,39649.92	CAT-8	-2	-40.5	-800.5	1	7.08598	0	
Carr0_FR2_DL_100NHz_QPSK_Channel_2260333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.96 ,39649.92	CAT-B	-4	-0.5	-40.5	1	17.8384	0	
Carr0_FR2_DL_100WHz_QPSK_Channel_2298333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.95 ,39649.92	CAT-8	1	0.5	40.5	1	20.8638	0	
Carr0_FR2_DL_100VHz_QPSK_Channel_2298333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.95 ,39649.92	CAT-8	2	40.5	800.5	1	10.4912	0	
Carr0_FR2_DL_100NHz_QPSK_Channel_2268333_TargetPower=45.5d8m	139	39350.04 ,39450.00 ,39549.96 ,39649.92	CAT-B	3	805	1800.04	10	17.116	0	

OBUE Margin Summary

Carrier ID	Tx Beam ID	DL Freq (MHz)	Carr Power(dBm)	Worst OBUE Offset	Worst OBUE Margin	Worst OBUE Margin Min	Time (s)
0	11	37350.00 ,37449.96 ,37549.92 ,37649.88	45.4548	2	12.3621	0	
0	11	37350.00 ,37449.96 ,37549.92 ,37649.88	45.4489	2	12.2541	0	
0	11	38350.08 ,38450.04 ,38550.00 ,38649.96	45.6769	-2	10.6902	0	
0	11	38350.08 ,38450.04 ,38550.00 ,38649.96	45.6519	-2	10.8139	0	
0	11	39350.04 ,39450.00 ,39549.96 ,39649.92	45.7664	-2	9.15597	0	
0	11	39350.04 ,39450.00 ,39549.96 ,39649.92	45.7441	-2	8.77824	0	
0	139	37350.00 ,37449.96 ,37549.92 ,37649.88	45.4712	-2	11.3612	0	
0	139	37350.00 ,37449.96 ,37549.92 ,37649.88	45.4775	-2	11.1254	0	
0	139	38350.08 ,38450.04 ,38550.00 ,38649.96	45.9128	-2	9.25844	0	
0	139	38350.08 ,38450.04 ,38550.00 ,38649.96	45.9478	-2	9.31338	0	
0	139	39350.04 ,39450.00 ,39549.96 ,39649.92	45.3049	-2	7.44366	0	
0	139	39350.04 ,39450.00 ,39549.96 ,39649.92	45.2944	-2	7.08598	0	

As can be seen from the plots and the above data, our radio meets the ITU 243 OOBE limits as requested by NASA.

Thanks

Srinivas Bokka