

RF Exposure Evaluation

LIMIT

RSS-102 Section 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

Antenna Information

For WWAN

Antenna Type:	Patch Antenna	
	Ceramic Chip Antenna	
Antenna gain:	Patch Antenna	1.23dBi
	Ceramic Chip Antenna	3.2dBi

TEST RESULT

☒ **Passed** ☐ **Not Applicable**

Maximum conducted output power (Measured) & Manufacturing tolerance

Specification	Operating Mode	Conducted Output Power (dBm)	Target (dBm)	Tolerance ±(dB)
GSM	850	31.91	32	1
	1900	29.48	30	1
LTE CAT M1	Band 2	20.45	20	1
	Band 4	20.29	20	1
	Band 5	20.53	20	1
	Band 12	20.99	20	1
	Band 13	20.77	20	1
	Band 25	20.66	20	1
	Band 26	21.00	20	1
	Band 26	21.00	20	1
	Band 66	20.47	20	1
	Band 85	20.92	20	1

Evaluation Results:

Collocated WWAN and other Wireless						For IC
Band	Antenna Distance (cm)	Antenna Gain (dBi)	Maximum Power	Maximum EIRP/ERP	Maximum EIRP/ERP	Limit (W)
			(dBm)	(dBm)	(W)	
GSM850*	20	3.2	23.97	25.02	0.318	1.29
GSM1900*	20	3.2	21.97	25.17	0.329	2.28
LTE Band 2	20	3.2	21	24.2	0.263	2.24
LTE Band 4	20	3.2	21	24.2	0.263	2.12
LTE Band 5	20	3.2	21	22.05	0.160	1.29
LTE Band 12	20	3.2	21	22.05	0.160	1.15
LTE Band 13	20	3.2	21	22.05	0.160	1.24
LTE Band 25	20	3.2	21	24.2	0.263	2.24
LTE Band 26	20	3.2	21	22.05	0.160	1.28
LTE Band 26	20	3.2	21	22.05	0.160	1.29
LTE Band 66	20	3.2	21	24.2	0.263	2.12
LTE Band 85	20	3.2	21	22.05	0.160	1.15

Remark:

1. Output power including tune up tolerance;
2. For GSM, Average conducted power is used to calculate:

Band	Burst Turn Up Power(dBm)	Division Factors	Maximum Power (dBm)
GSM 850	33	9.03	23.97
GSM 1900	31	9.03	21.97

The division factor is as follows:

1Txslot = 1 transmit time slot out of 8 time slots

→Conducted power divided by (8/1) →9.03

2. The exposure safety distance is 20cm.
3. $EIRP = \text{Maximum Output Power} + \text{Antenna Gain}$
4. $ERP = \text{Maximum Output Power} + \text{Antenna Gain} - 2.15$
5. EUT has two antenna types, and only the highest antenna gain mode is evaluated in the report
6. There are four types of EUT, FQ02 is an internal antenna without a battery, FQ02-BAT is an internal antenna with a battery, FQ02-ANT is an external antenna without a battery, and FQ02-ANT-BAT is an external antenna with a battery. For conducted measurement FQ02-ANT-BAT type is used for report evaluation.

Conclusion

The measurement results comply with the RSS Limit per RSS-102 for the uncontrolled RF Exposure.