

LETTER OF REQUEST

PERMISSIVE CHANGE

September 1, 2023

We, as a manufacturer of following equipment, hereby submit Class 2 Permissive Change application for the FCC and the ISSED to change components in the filings.

MODEL	FCC		ISED	
TM05NNNABM0	FCC ID	BEJTM05NNNABM0	Certification Number	2703H-TM05NNNABM0
	Original Grant Date	March 29, 2022	Original Grant Date	March 23, 2022
	Equipment Type	Single Modular		

A. Antenna Information [SIM 2]

We have additional antenna called F66 Roof-top Antenna and gain was measured in each band for SIM2.

Antenna No.	Antenna Name	Antenna Part Number
1	Antenna Box	8705921
2	FSA WAVE 5G (left/right)	8705919/8705920
3	HKL Mobilradioantenna	5A2D602
4	ZB Spoilerantenna	5A0C5B0
5	F66 Roof-top Antenna	920-747-013

Operating Frequency (MHz)		Antenna Peak Gain (dBi)			
		Ant. No	Ant. Gain	Cable Loss	Final Gain
LTE Band 71 NR Band 71	663 ~ 698	Ant. 1	-3.00	0.57	-3.57
		Ant. 2	4.00	0.57	3.43
		Ant. 3	5.00	0.57	4.43
		Ant. 4	4.00	0.57	3.43
		Ant. 5	2.50	1.44	1.06
LTE Band 12/17	669 ~ 716	Ant. 1	3.00	0.57	2.43
		Ant. 2	4.00	0.57	3.43
		Ant. 3	5.00	0.57	4.43
		Ant. 4	3.00	0.57	2.43
		Ant. 5	2.50	1.44	1.06
LTE Band 13	777 ~ 787	Ant. 1	3.00	0.57	2.43
		Ant. 2	4.00	0.57	3.43
		Ant. 3	5.00	0.57	4.43
		Ant. 4	3.00	0.57	2.43
		Ant. 5	2.30	1.44	0.86
GSM850 LTE Band 26/5	814 ~ 849	Ant. 1	3.00	0.57	2.43
		Ant. 2	4.00	0.57	3.43
		Ant. 3	5.00	0.57	4.43
		Ant. 4	3.00	0.57	2.43
		Ant. 5	1.90	1.44	0.46
LTE Band 66/4 NR Band 66	1 710 ~ 1 780	Ant. 1	5.00	0.79	4.21
		Ant. 2	4.00	0.79	3.21
		Ant. 3	5.00	0.79	4.21
		Ant. 4	4.00	0.79	3.21
		Ant. 5	3.00	2.00	1.00
GSM 1 900	1 850 ~ 1 915	Ant. 1	5.00	0.89	4.11

LTE Band 25/2 NR Band 25		Ant. 2	4.00	0.89	3.11
		Ant. 3	5.00	0.89	4.11
		Ant. 4	4.00	0.89	3.11
		Ant. 5	6.70	2.26	4.44
LTE Band 7/41 NR Band 41	2 496 ~ 2 690	Ant. 1	5.00	1.04	3.96
		Ant. 2	5.00	1.04	3.96
		Ant. 3	5.00	1.04	3.96
		Ant. 4	4.00	1.04	2.96
		Ant. 5	8.50	2.63	5.87
NR Band 77	3 450 ~ 3 550	Ant. 1	5.00	1.15	3.85
		Ant. 2	5.00	1.15	3.85
		Ant. 3	5.00	1.15	3.85
		Ant. 4	3.00	1.15	1.85
		Ant. 5	6.70	2.91	3.79
	3 700 ~ 3 980	Ant. 1	5.00	1.15	3.85
		Ant. 2	5.00	1.15	3.85
		Ant. 3	5.00	1.15	3.85
		Ant. 4	3.00	1.15	1.85
		Ant. 5	6.70	2.91	3.79

This product is a professional installation equipment and installed by vehicle manufacturer.

As antennas will be installed by vehicle manufacturer. Vehicle manufacturer will implement specific software version for each antenna and vehicle.

B. E.R.P./ E.I.R.P. [SIM2]

Due to increasing some antenna gain, E.R.P./ E.I.R.P. was recalculated to comply the limits in Parts 22, 24, 27, and 90 of FCC rules and RSS standards.

GSM

Band	Frequency (MHz)	Maximum Conducted Power (dBm)	Maximum Conducted Power (W)	Duty Cycle (%)	Worst Antenna Gain (dBi)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dBm)	Maximum E.R.P. (W)	Limit
850	824 ~ 849	32.10	1.622	25	4.43	30.51	1.124	28.36	0.685	7 W E.R.P.
1 900	1 850 ~ 1 910	28.20	0.661	25	4.44	26.62	0.459			2 W E.I.R.P.

LTE

Band	Frequency (MHz)	Maximum Conducted Power (dBm)	Maximum Conducted Power (W)	Worst Antenna Gain (dBi)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dBm)	Maximum E.R.P. (W)	Limit
7	2 500 ~ 2 570	22.85	0.193	5.87	28.72	0.745			2 W E.I.R.P.
12/17	699 ~ 716	23.16	0.207	4.43	25.44	0.350	23.29	0.213	30 W E.R.P.
13	777 ~ 787	23.64	0.231	4.43	25.92	0.391	23.77	0.238	30 W E.R.P.
25/2	1 850 ~ 1 915	22.76	0.189	4.44	27.20	0.525			2 W E.I.R.P.
26/5 Part 22	824 ~ 849	22.97	0.198	4.43	25.25	0.335	23.10	0.204	7 W E.R.P.
26 Part 90	814 ~ 824	22.62	0.183	4.43	24.90	0.309	22.75	0.188	100 W
41 FCC	2 496 ~ 2 690	25.54	0.358	5.87	31.41	1.384			2 W E.I.R.P.
41 IC	2 500 ~ 2 690	25.54	0.358	5.87	31.41	1.384			2 W E.I.R.P.

66/4	1 710 ~ 1 755	22.93	0.196	4.21	27.14	0.518			1 W E.I.R.P.
71	663 ~ 698	22.54	0.179	4.43	26.97	0.498	24.82	0.303	3 W E.R.P.

5G NR

Band	Frequency (MHz)	Maximum Conducted Power (dBm)	Maximum Conducted Power (W)	Worst Antenna Gain (dBi)	Maximum E.I.R.P. (dBm)	Maximum E.I.R.P. (W)	Maximum E.R.P. (dBm)	Maximum E.R.P. (W)	Limit
n25	1 850 ~ 1 915	23.69	0.234	4.44	28.13	0.650			2 W E.I.R.P.
n41 FCC	2 496 ~ 2 690	22.31	0.170	5.87	28.18	0.658			2 W E.I.R.P.
n41 IC	2 500 ~ 2 690	21.98	0.158	5.87	27.85	0.610			2 W E.I.R.P.
n66	1 710 ~ 1 755	23.19	0.208	4.21	27.40	0.550			1 W E.I.R.P.
n71	663 ~ 698	23.48	0.223	4.43	27.91	0.618	25.76	0.377	3 W E.R.P.

Remark;

1. E.I.R.P. (dB m) = Maximum Conducted Power (dB m) + Antenna Gain (dB i)
2. E.R.P. (dB m) = E.I.R.P. (dB m) - 2.15 (dB); where E.R.P. and E.I.R.P. are expressed in consistent units.

C. Radiated Spurious Emissions

The Radiated spurious emissions were tested with additional antenna on SIM 2 in the band where the antenna gain is increased.

Operating Frequency (MHz)		Test Case
GSM 1 900	1 850 ~ 1 910	GSM 1 900 (Voice)
LTE Band 7	2 500 ~ 2 570	LTE Band 7 (10 MHz – QPSK)
LTE Band 25/2	1 850 ~ 1 915	LTE Band 25 (5 MHz – QPSK)
LTE Band 41	2 496 ~ 2 690	LTE Band 41 (20 MHz – QPSK)
NR Band 25	1 850 ~ 1 915	NR Band 25 (20 MHz – QPSK)
NR Band 41	2 496 ~ 2 690	NR Band 41 (30 MHz – BPSK)

D. Declaration

The model with additional antenna comply ERP/EIRP requirements, power thresholds for exemption from routine evaluation, MPE limits at 20cm and the limits in Parts 22, 24, 27, and 90 of FCC rules and RSS standards.

Based on technical analysis mentioned above, we hereby request permissive change for both FCC and ISSED certification.



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