Permissive change request to authorize additional antennas for Part 96 operations with an FCC Hardware Certified Part 96 CBSD radio device.

Radio Vendor: **SAMSUNG Electronics CO., Ltd**

Radio Product Name: **RT4401**

Radio Model Number: **RT4401-48A**

Radio FCC ID: **A3LRT4401-48A**

Radio dynamic range:

- Maximum linear conducted power rating at output connector into 50 ohms that meets all OOBE requirements [zero additional attenuation, highest power setting allowed, for use with lowest gain external antennas](dBm): 5W [37 (dBm)]
- Minimum linear conducted power rating at output connector into 50 ohms that meets all OOBE requirements [maximum additional linear attenuation, lowest power setting allowed, for use with highest gain external antennas](dBm): 0.05W [17 (dBm)]
- Note: use of an external cable introduces additional losses that may be compensated appropriately by increasing the radio's power level (reducing the attenuator setting). This cable compensation may be achieved during radio setup.

The Original Equipment Manufacturer (OEM) vendor of the radio states that the use of the following listed external antennas meet all requirements for Part 96 operations. The following specific external antennas may be used in conjunction with this model radio at the appropriate listed power settings.

These antennas will allow this radio to meet the appropriate Part 96 requirements for Maximum EIRP, either at or below:

- 30 dBm/10 MHz EIRP (for Category A operations), or
- 47 dBm/10 MHz EIRP (for Category B operations).

CBRS Band 48 External antennas authorized by the Original Equipment Manufacturer for use with this model radio

Antenna Configuration	Antenna Vendor	Antenna Model Number	Antenna Main Beam Peak Gain (dBi)	Radio Conducted Power Setting (attenuator setting) (dB)	Maximum Allowed EIRP Rating	Operational Category (A / B)
1	JMA	CX14OMI236-1C	5.2	37 dBm (0 dB)	43.7 dBm / 10 MHz	B
2	JMA	CX16OMI236-1C	5.3	37 dBm (0 dB)	43.8 dBm/ 10 MHz	B
3	JMA	CX16OMI224-1H	9.6	35.9 dBm(1.1 dB)	47 dBm/ 10 MHz	B
4	JMA	CX16OMI218-1P	8.9	36.6 dBm(0.4 dB)	47 dBm/ 10 MHz	B
5	Amphenol	C2U3MT360X06Fxys0	8.1	37 dBm(0 dB)	46.6 dBm/ 10 MHz	B
6	Amphenol	2C2U3MT360X06Fxys0	5.8	37 dBm (0 dB)	44.3 dBm/ 10 MHz	B
7	Amphenol	4U4MT360X06Fxys0	9.8	35.7 dBm (1.3 dB)	48.3 dBm/ 10 MHz	B
8	Amphenol	2C4U3MT360X06Fxys0	5.9	37 dBm (0 dB)	44.4 dBm/ 10 MHz	B
9	Kathrein	84010555 / 84010556	7.9	37 dBm (0 dB)	46.4 dBm/ 10 MHz	B
10	Kathrein	84010557 / 84010558	6.3	37 dBm (0 dB)	44.8 dBm/ 10 MHz	B
11	Kathrein	84010603 / 84010604	7.1	37 dBm (0 dB)	45.6 dBm/ 10 MHz	B
12	CommScope	VVSSP-360S-F	5	37 dBm (0 dB)	43.5 dBm/ 10 MHz	B
13	CommScope	NNVVSSP-360S-FM	7.9	37 dBm (0 dB)	46.4 dBm/ 10 MHz	B
14	CommScope	V4SSPP-360S-F	5.5	37 dBm (0 dB)	44 dBm/ 10 MHz	B
15	JMA	DX10FRO260-00 or 06	16.5	29 dBm (8 dB)	47 dBm/ 10 MHz	B
16	JMA	DX12FRO260-20 or 26	17.7	27.8 dBm (9.2 dB)	47 dBm/ 10 MHz	B
17	Amphenol	2U3MX065X06Fxys0	11.6	33.9 dBm (3.1 dB)	47 dBm/ 10 MHz	B
18	Amphenol	4U4MX065X06Fxys0	11.3	34.2 dBm (2.8 dB)	47 dBm/ 10 MHz	B
19	Amphenol	2C4U3MX065X06Fwxys0	8.9	36.6 dBm (0.4 dB)	47 dBm/ 10 MHz	B
20	Kathrein	84010564	11.5	34 dBm (3 dB)	47 dBm/ 10 MHz	B
21	CommScope	VVSSP-65S-R1B (Canister)	10.2	35.3 dBm (1.7 dB)	47 dBm/ 10 MHz	B
22	CommScope	VVSSP-65S-R1BV2 (Panel)	10.4	35.1 dBm (1.9 dB)	47 dBm / 10 MHz	B

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Total EIRP Calculation

Antenna Configuration	Radio Conducted Power Setting per Port (dBm)	MIMO power (4Tx) (dBm)	Ant. Beam Peak Gain (dBi)	Directional Gain (dBi)	Total EIRP (dBm)	Worst Case Scenario
1	37	43	5.2	8.2	51.20	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
2	37	43	5.3	8.3	51.30	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
3	35.9	41.9	9.6	12.6	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
4	36.6	42.6	8.9	11.9	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
5	37	43	8.1	11.1	54.10	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
6	37	43	5.8	8.8	51.80	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
7	35.7	41.7	9.8	12.8	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
8	37	43	5.9	8.9	51.90	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
9	37	43	7.9	10.9	53.90	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
10	37	43	6.3	9.3	52.30	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM

11	37	43	7.1	10.1	53.10	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
12	37	43	5	8.0	51.00	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
13	37	43	7.9	10.9	53.90	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
14	37	43	5.5	8.5	51.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
15	29	35	16.5	19.5	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
16	27.8	33.8	17.7	20.7	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
17	33.9	39.9	11.6	14.6	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
18	34.2	40.2	11.3	14.3	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
19	36.6	42.6	8.9	11.9	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
20	34	40	11.5	14.5	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
21	35.3	41.3	10.2	13.2	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM
22	35.1	41.1	10.4	13.4	54.50	Bandwidth: 4Carrier (20+20+20+20) Modulation: QPSK, QAM

*Note: This total EIRP values are the calculation value of worst case scenario over every modulation and Bandwidth described in original Grant.

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