SPOT CHECK EVALUATION

FCC ID	:	**RI7FN990A28HP**
Equipment	:	**5G NR Module**
Brand Name	:	**Telit**
Model Name	:	**FN990A28-HP**
Marketing Name	:	**FN990A28-HP**
Applicant	:	**Telit Communications S.p.A.** **Via Stazione Di Prosecco 5/B, Trieste 34010, Italy**
Manufacturer	:	**Telit Communications S.p.A.** **Via Stazione Di Prosecco 5/B, Trieste 34010, Italy**
Standard	:	**47 CFR Part 2, 22(H), 24(E), 27, 90(R), 90(S), 96**

The product was received on Mar. 25, 2024 and testing was performed from May 04, 2024 to Jun. 11, 2024. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this spot check report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

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Approved by: Louis Wu

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History of this test report

Version	Description	Issue Date
01	Initial issue of report	Jun. 19, 2024

1. Introduction Section

This Equipment Compliance Review (ECR) inquiry seeks confirmation on whether the FCC will permit the Applicant to apply the data reference procedures outlined in KDB Publication 484596 to certify the variant model FN990A28-HP (FCCID: RI7FN990A28HP) by referencing the test data from the parent model FN990A40-HP (FCCID: RI7FN990A40HP), as a reference model.

Then, given FCC approval of the data reference plan, the variant model FN990A28-HP will reference the parent model test data to demonstrate compliance. The spot check data in this report is used to justify the data reuse.

2. Model Difference Information

The following is the details of difference between the two models. Both utilize the same PCB layout with the following primary changes:

Item #1: Main chipset change from SDX65 to SDX 62 (Pin to Pin compatible), impacting LTE and 5GNR receiver performance rather than transmitter performance.

Item #2: One SDR735 RF transceiver removed in variant model FN990A28-HP, going from dual SDR735 chips in parent model FN990A40-HP to a single SDR735 (#1) chip. The variant model FN990A28-HP using single SDR735 have less CA/ENDC capability in Downlink than dual SDR735 in parent model FN990A40-HP. All transmit controls are connected to the remaining SDR735 #1 chip, resulting in no difference in transmit performance between the two models. Relevant schematics and partial RF block diagrams in the Change Note illustrate the de-mounted transceiver.

Please refer to the attached Change Note for full details.

Assessment plan: As the key transmit components and performance are the same between parent and variant model. The main changes of receiver performance and non-RF components should not substantially impact emissions. Also, the changed components have been thoroughly reviewed and confirmed to not influence any transmitter parameters or emissions. The assessment plan will verify the conducted power, peak-to-average ratio and unwanted emission (Band edge and spurious emissions) from the worst cases identified in the parent model, and ensure that the fundamental emission stays within the authorized frequency block. When new spot-check data from the variant model keep within 3dB variation between parent and variant models, the data reference can be applied for variant model. The applicant should take full responsibility that the test data as referenced in this document represent compliance for this variant model: FN990A28-HP.

3. Spot Check Verification Data Section

The spot check test configurations were selected from the worst and representative case in the parent model and tested to demonstrate the test data from original model remains representative for the variant model.

Summary for spot check for each rule entry and technology is listed as below:

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Conducted Power (dBm)	WWAN 3G Band 2	23.04	23.36	0.32
	WWAN 3G Band 4	23.02	22.95	-0.07
	WWAN 3G Band 5	23.32	23.33	0.01
	WWAN LTE Band 2	22.97	22.89	-0.08
	WWAN LTE Band 4	23.05	22.71	-0.34
	WWAN LTE Band 5	22.98	22.99	0.01
	WWAN LTE Band 7	23.37	23.3	-0.07
	WWAN LTE Band 12	23.3	23.22	-0.08
	WWAN LTE Band 13	23.06	23	-0.06
	WWAN LTE Band 14	23	22.85	-0.15
	WWAN LTE Band 17	23.24	23.04	-0.2
	WWAN LTE Band 25	22.98	22.76	-0.22
	WWAN LTE Band 26	23.03	22.86	-0.17
	WWAN LTE Band 30	22.76	22	-0.76
	WWAN LTE Band 38	23.2	23.29	0.09
	WWAN LTE Band 41	25.48	25.7	0.22
	WWAN LTE Band 42 (3450~3550MHz)	21.5	21.47	-0.03
	WWAN LTE Band 42 (3550~3600MHz)	21.44	21.4	-0.04
	WWAN LTE Band 43 (3600~3700MHz)	21.3	21.32	-0.02
	WWAN LTE Band 48 (3550~3700MHz)	21.43	21.31	-0.12
	WWAN LTE Band 66	23.09	22.81	-0.28
	WWAN LTE Band 71	23.31	23.16	-0.15
	WWAN NR n2	23.83	23.33	-0.5
	WWAN NR n5	23.78	23.1	-0.68
	WWAN NR n7	23.65	23.56	-0.09
	WWAN NR n12	23.39	23.24	-0.15
	WWAN NR n13	23.02	22.8	-0.22
	WWAN NR n14	22.94	22.85	-0.09
	WWAN NR n25	23.81	23.35	-0.46
	WWAN NR n26	23.22	22.97	-0.25
	WWAN NR n30	22.97	22.21	-0.76
	WWAN NR n38	24.12	23.36	-0.76
	WWAN NR n41	26.73	26.29	-0.44
	WWAN NR n48	21.59	21.84	0.25
	WWAN NR n66	23.5	23.23	-0.27
	WWAN NR n71	23.48	23.43	-0.05

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Conducted Power (dBm)	WWAN NR n77 (3450~3550MHz)	26.97	26.99	0.02
	WWAN NR n77 (3700~3980MHz)	26.86	27	0.14
	WWAN NR n78 (3450~3550MHz)	26.98	26.98	0
	WWAN NR n78 (3700~3800MHz)	26.89	26.97	0.08
	WWAN LTE CA 2C	24.82	23.63	-1.19
	WWAN LTE CA 5B	24.51	23.78	-0.73
	WWAN LTE CA 7C	24.82	23.97	-0.85
	WWAN LTE CA 38C	23.64	24.1	0.46
	WWAN LTE CA 41C	26.24	26.33	0.09
	WWAN LTE CA 42C (3450~3550MHz)	22.79	22.51	-0.28
	WWAN LTE CA 42C (3550~3600MHz)	11.14	11.13	-0.01
	WWAN LTE CA 43C (3600~3700MHz)	11.21	11.22	0.01
	WWAN LTE CA 48C (3550~3700MHz)	11.1	11.26	0.16
	WWAN LTE CA 66B	24	23.56	-0.44
	WWAN LTE CA 66C	24.19	23.69	-0.5
	WWAN NR n38 UL MIMO	22.23	21.85	-0.38
	WWAN NR n41 UL MIMO	25.32	24.9	-0.42
	WWAN NR n48 UL MIMO (3550~3700MHz)	21.17	21.2	0.03
	WWAN NR n77 UL MIMO (3450~3550MHz)	24.92	24.7	-0.22
	WWAN NR n77 UL MIMO (3700~3980MHz)	25.09	25.57	0.48
	WWAN NR n78 UL MIMO (3450~3550MHz)	24.67	24.46	-0.21
	WWAN NR n78 UL MIMO (3700~3800MHz)	24.85	25.31	0.46
	WWAN NR n41 (PC1.5)	28.45	27.92	-0.53
	WWAN NR n77 (PC1.5) (3450~3550MHz)	28.5	28.62	0.12
	WWAN NR n77 (PC1.5) (3700~3980MHz)	28.51	28.67	0.16
	WWAN NR n78 (PC1.5) (3450~3550MHz)	28.37	28.46	0.09
	WWAN NR n78 (PC1.5) (3700~3800MHz)	28.27	28.48	0.21

According to KDB 412172 D01 Power Approach,

EIRP = PT + GT – LC, ERP = EIRP -2.15, where

PT = transmitter output power in dBm

GT = gain of the transmitting antenna in dBi

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

The MIMO mode is completely uncorrelated, so the directional gain is selected the maximum gain among all antennas.

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Peak-to-Average Ratio (dB)	WWAN 3G Band 2	2.88	3.24	0.36
	WWAN 3G Band 4	2.88	3.2	0.32
	WWAN 3G Band 5	3.08	3.32	0.24
	WWAN LTE Band 7	4.7	4.75	0.05
	WWAN LTE Band 12	4.49	4.55	0.06
	WWAN LTE Band 13	4.52	4.46	-0.06
	WWAN LTE Band 14	4.52	4.58	0.06
	WWAN LTE Band 25	4.58	4.67	0.09
	WWAN LTE Band 26	4.78	4.49	-0.29
	WWAN LTE Band 30	4.67	4.64	-0.03
	WWAN LTE Band 41	8.49	8.43	-0.06
	WWAN LTE Band 42 (3450~3550MHz)	4.58	4.64	0.06
	WWAN LTE Band 48 (3550~3700MHz)	8.58	8.55	-0.03
	WWAN LTE Band 66	4.78	4.75	-0.03
	WWAN LTE Band 71	4.29	4.26	-0.03
	WWAN NR n5	5.66	4.66	-1
	WWAN NR n7	5.6	4.62	-0.98
	WWAN NR n12	5.54	4.56	-0.98
	WWAN NR n13	5.86	4.8	-1.06
	WWAN NR n14	5.18	4.58	-0.6
	WWAN NR n25	5.82	4.62	-1.2
	WWAN NR n26	5.36	4.62	-0.74
	WWAN NR n30	5.82	4.68	-1.14
	WWAN NR n41	4.64	4.52	-0.12
	WWAN NR n48	5.8	4.6	-1.2
	WWAN NR n66	7.3	4.72	-2.58
	WWAN NR n71	5.86	4.42	-1.44
	WWAN NR n77 (3700~3980MHz)	4.72	4.6	-0.12
	WWAN NR n78 (3450~3550MHz)	4.7	4.52	-0.18
	WWAN NR n41 UL MIMO	6.72	6.62	-0.1
	WWAN NR n48 UL MIMO (3550~3700MHz)	8.30	6.68	-1.62
	WWAN NR n77 UL MIMO (3700~3980MHz)	6.66	6.78	0.12
	WWAN NR n78 UL MIMO (3450~3550MHz)	6.68	6.68	0
	WWAN NR n41 (PC1.5)	6.46	4.62	-1.84
	WWAN NR n77 (PC1.5) (3450~3550MHz)	4.86	6.08	1.22
	WWAN NR n77 (PC1.5) (3700~3980MHz)	4.86	4.58	-0.28

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Results
26dB Bandwidth (MHz)	WWAN 3G Band 2	4.73	4.74	Within the authorized frequency block
	WWAN 3G Band 4	4.73	4.74	
	WWAN 3G Band 5	4.74	4.72	
	WWAN LTE Band 7	19.1	18.94	
	WWAN LTE Band 12	9.95	9.95	
	WWAN LTE Band 13	10.11	9.75	
	WWAN LTE Band 14	10.07	9.91	
	WWAN LTE Band 25	19.14	19.26	
	WWAN LTE Band 26	3.16	2.99	
	WWAN LTE Band 30	10.17	9.67	
	WWAN LTE Band 41	18.74	19.1	
	WWAN LTE Band 42 (3450~3550MHz)	18.74	18.98	
	WWAN LTE Band 48 (3550~3700MHz)	10.11	10.15	
	WWAN LTE Band 66	19.5	19.14	
	WWAN LTE Band 71	19.14	18.82	
	WWAN LTE CA 2C	25.38	25.37	
	WWAN LTE CA 5B	8.15	8.08	
	WWAN LTE CA 7C	34.97	34.96	
	WWAN LTE CA 41C	24.93	24.92	
	WWAN LTE CA 42C (3450~3550MHz)	24.68	24.92	
	WWAN LTE CA 48C (3550~3700MHz)	35.04	34.89	
	WWAN LTE CA 66B	14.72	14.62	
	WWAN LTE CA 66C	29.91	29.91	
	WWAN NR n5	19.94	20.44	
	WWAN NR n7	15.05	15.36	
	WWAN NR n12	15.28	15.26	
	WWAN NR n13	10.31	10.28	
	WWAN NR n14	10.36	10.29	
	WWAN NR n25	15.08	15.28	
	WWAN NR n26	20.47	20.42	
	WWAN NR n30	9.99	10.37	
	WWAN NR n41	40.52	40.78	
	WWAN NR n48	40.52	40.73	
	WWAN NR n66	29.73	32.94	
	WWAN NR n71	19.94	20.43	
	WWAN NR n77 (3700~3980MHz)	40.28	40.89	
	WWAN NR n78 (3450~3550MHz)	40.44	40.84	
	WWAN NR n41 UL MIMO	40.28	40.97	
	WWAN NR n48 UL MIMO (3550~3700MHz)	40.36	40.88	
	WWAN NR n77 UL MIMO (3700~3980MHz)	29.31	30.91	
	WWAN NR n78 UL MIMO (3450~3550MHz)	40.44	40.85	
	WWAN NR n41 (PC1.5)	41.03	41.02	
	WWAN NR n77 (PC1.5) (3450~3550MHz)	40.89	40.99	
	WWAN NR n77 (PC1.5) (3700~3980MHz)	40.89	40.83	

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Results
Occupied Bandwidth (MHz)	WWAN 3G Band 2	4.16	4.16	Within the authorized frequency block
	WWAN 3G Band 4	4.16	4.16	
	WWAN 3G Band 5	4.15	4.15	
	WWAN LTE Band 7	17.86	17.94	
	WWAN LTE Band 12	8.97	9.05	
	WWAN LTE Band 13	9.01	9.03	
	WWAN LTE Band 14	8.97	9.05	
	WWAN LTE Band 25	17.94	17.9	
	WWAN LTE Band 26	2.73	2.73	
	WWAN LTE Band 30	9.09	8.99	
	WWAN LTE Band 41	17.98	17.86	
	WWAN LTE Band 42 (3450~3550MHz)	17.82	17.86	
	WWAN LTE Band 48 (3550~3700MHz)	9.05	9.01	
	WWAN LTE Band 66	17.86	17.86	
	WWAN LTE Band 71	17.86	17.86	
	WWAN LTE CA 2C	23.48	23.37	
	WWAN LTE CA 5B	7.53	7.54	
	WWAN LTE CA 7C	32.94	33	
	WWAN LTE CA 41C	23.38	23.32	
	WWAN LTE CA 42C (3450~3550MHz)	23.28	22.92	
	WWAN LTE CA 48C (3550~3700MHz)	32.59	33.14	
	WWAN LTE CA 66B	13.88	13.87	
	WWAN LTE CA 66C	28.05	27.81	
	WWAN NR n5	18.88	18.92	
	WWAN NR n7	14.17	14.16	
	WWAN NR n12	14.11	14.12	
	WWAN NR n13	9.31	9.29	
	WWAN NR n14	9.32	9.3	
	WWAN NR n25	14.14	14.15	
	WWAN NR n26	18.98	18.93	
	WWAN NR n30	9.28	9.32	
	WWAN NR n41	38.06	37.95	
	WWAN NR n48	37.9	38.07	
	WWAN NR n66	28.59	28.9	
	WWAN NR n71	18.92	18.93	
	WWAN NR n77 (3700~3980MHz)	38.01	38	
	WWAN NR n78 (3450~3550MHz)	38.04	38.03	
	WWAN NR n41 UL MIMO	37.94	37.97	
	WWAN NR n48 UL MIMO (3550~3700MHz)	37.88	38.09	
	WWAN NR n77 UL MIMO (3700~3980MHz)	27.93	28.18	
	WWAN NR n78 UL MIMO (3450~3550MHz)	38.07	37.99	
	WWAN NR n41 (PC1.5)	38.08	38.13	
	WWAN NR n77 (PC1.5) (3450~3550MHz)	38.09	38	
	WWAN NR n77 (PC1.5) (3700~3980MHz)	38.07	38.02	

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Conducted Band Edge / Emission Mask (dBm)	WWAN 3G Band 2	-21.86	-24.66	-2.8
	WWAN 3G Band 4	-23.45	-24.27	-0.82
	WWAN 3G Band 5	-27.26	-27.19	0.07
	WWAN LTE Band 7	-12.7	-14.48	-1.78
	WWAN LTE Band 12	-30.57	-30.03	0.54
	WWAN LTE Band 13	-33.48	-30.94	2.54
	WWAN LTE Band 14	-46.06	-44.8	1.26
	WWAN LTE Band 25	-20.56	-22.92	-2.36
	WWAN LTE Band 26	-16.62	-15.36	1.26
	WWAN LTE Band 30	-31.08	-32.57	-1.49
	WWAN LTE Band 41	-25.1	-27.14	-2.04
	WWAN LTE Band 42 (3450~3550MHz)	-25.82	-25.01	0.81
	WWAN LTE Band 48 (3550~3700MHz)	-47.45	-45.95	1.5
	WWAN LTE Band 66	-21.46	-24	-2.54
	WWAN LTE Band 71	-23.42	-26.07	-2.65
	WWAN LTE CA 2C	-22.79	-23.93	-1.14
	WWAN LTE CA 5B	-26.63	-27.36	-0.73
	WWAN LTE CA 7C	-29.11	-30.31	-1.2
	WWAN LTE CA 41C	-32.48	-31.29	1.19
	WWAN LTE CA 42C (3450~3550MHz)	-17.5	-18.88	-1.38
	WWAN LTE CA 48C (3550~3700MHz)	-48.15	-48.74	-0.59
	WWAN LTE CA 66B	-24.18	-24.31	-0.13
	WWAN LTE CA 66C	-25.42	-28.3	-2.88
	WWAN NR n5	-27.69	-28.24	-0.55
	WWAN NR n7	-33.25	-36.17	-2.92
	WWAN NR n12	-37.01	-34.63	2.38
	WWAN NR n13	-27.87	-26.71	1.16
	WWAN NR n14	-46.19	-46.9	-0.71
	WWAN NR n25	-29.43	-29.69	-0.26
	WWAN NR n26	-27.39	-25.94	1.45
	WWAN NR n30	-33.13	-33.33	-0.2
	WWAN NR n41	-32.09	-33.42	-1.33
	WWAN NR n48	-40.23	-40.13	0.1
	WWAN NR n66	-33.81	-31.14	2.67
	WWAN NR n71	-30.41	-28.24	2.17
	WWAN NR n77 (3700~3980MHz)	-26.4	-25.87	0.53
	WWAN NR n78 (3450~3550MHz)	-31.62	-29.67	1.95
	WWAN NR n41 UL MIMO	-33.35	-33.26	0.09
	WWAN NR n48 UL MIMO (3550~3700MHz)	-40.31	-40.24	0.07
	WWAN NR n77 UL MIMO (3700~3980MHz)	-26.08	-23.90	2.18
	WWAN NR n78 UL MIMO (3450~3550MHz)	-31.24	-29.33	1.91
	WWAN NR n41 (PC1.5)	-34.29	-35.34	-1.05
	WWAN NR n77 (PC1.5) (3450~3550MHz)	-29.86	-29.05	0.81
	WWAN NR n77 (PC1.5) (3700~3980MHz)	-24.68	-23.88	0.8

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Conducted Spurious Emission (dBm)	WWAN 3G Band 2	-25.31	-26.61	-1.3
	WWAN 3G Band 4	-25.14	-26.25	-1.11
	WWAN 3G Band 5	-32.49	-33.65	-1.16
	WWAN LTE Band 7	-36.41	-37.12	-0.71
	WWAN LTE Band 12	-41.11	-42.6	-1.49
	WWAN LTE Band 13	-41.27	-41.51	-0.24
	WWAN LTE Band 14	-41.67	-41.52	0.15
	WWAN LTE Band 25	-36.61	-37.4	-0.79
	WWAN LTE Band 26	-40.73	-41.53	-0.8
	WWAN LTE Band 30	-46.76	-47.36	-0.6
	WWAN LTE Band 41	-37.66	-39.09	-1.43
	WWAN LTE Band 42 (3450~3550MHz)	-27.14	-27.62	-0.48
	WWAN LTE Band 48 (3550~3700MHz)	-52.25	-50.92	1.33
	WWAN LTE Band 66	-36.64	-37.58	-0.94
	WWAN LTE Band 71	-40.9	-41.81	-0.91
	WWAN LTE CA 2C	-36.04	-37.53	-1.49
	WWAN LTE CA 5B	-40.6	-41.56	-0.96
	WWAN LTE CA 7C	-35.96	-37.08	-1.12
	WWAN LTE CA 41C	-37.32	-38	-0.68
	WWAN LTE CA 42C (3450~3550MHz)	-26.74	-27.53	-0.79
	WWAN LTE CA 48C (3550~3700MHz)	-48.85	-49.22	-0.37
	WWAN LTE CA 66B	-33.78	-33.87	-0.09
	WWAN LTE CA 66C	-35.87	-37.38	-1.51
	WWAN NR n5	-33.2	-32.99	0.21
	WWAN NR n7	-37.21	-36.17	1.04
	WWAN NR n12	-42.33	-43.07	-0.74
	WWAN NR n13	-32.79	-34.2	-1.41
	WWAN NR n14	-32.7	-34.21	-1.51
	WWAN NR n25	-42.69	-42.54	0.15
	WWAN NR n26	-33.31	-33.78	-0.47
	WWAN NR n30	-51.66	-52.9	-1.24
	WWAN NR n41	-35.11	-35.24	-0.13
	WWAN NR n48	-48.61	-50.18	-1.57
	WWAN NR n66	-42.45	-43.37	-0.92
	WWAN NR n71	-43.97	-44.06	-0.09
	WWAN NR n77 (3700~3980MHz)	-42.53	-43.41	-0.88
	WWAN NR n78 (3450~3550MHz)	-42.37	-43.57	-1.2
	WWAN NR n41 UL MIMO	-37.02	-37.08	-0.06
	WWAN NR n48 UL MIMO (3550~3700MHz)	-49.48	-47.42	2.06
	WWAN NR n77 UL MIMO (3700~3980MHz)	-42	-42.97	-0.97
	WWAN NR n78 UL MIMO (3450~3550MHz)	-42.15	-43.04	-0.89
	WWAN NR n41 (PC1.5)	-45.67	-45.16	0.51
	WWAN NR n77 (PC1.5) (3450~3550MHz)	-41.42	-41.86	-0.44
	WWAN NR n77 (PC1.5) (3700~3980MHz)	-41.55	-41.78	-0.23

Test Item	Mode	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Results
Frequency Stability Temperature & Voltage (ppm)	WWAN 3G Band 2	0.0027	0.0074	Within the authorized frequency block
	WWAN 3G Band 4	0.0115	0.015	
	WWAN 3G Band 5	0.0132	0.0167	
	WWAN LTE Band 7	0.0041	0.0054	
	WWAN LTE Band 12	0.0216	0.0105	
	WWAN LTE Band 13	0.0161	0.0156	
	WWAN LTE Band 14	0.0132	0.0193	
	WWAN LTE Band 25	0.0049	0.0094	
	WWAN LTE Band 26	0.0195	0.016	
	WWAN LTE Band 30	0.0063	0.008	
	WWAN LTE Band 41	0.0036	0.0054	
	WWAN LTE Band 42 (3450~3550MHz)	0.0028	0.0035	
	WWAN LTE Band 48 (3550~3700MHz)	0.0044	0.0031	
	WWAN LTE Band 66	0.0062	0.0083	
	WWAN LTE Band 71	0.0138	0.0229	
	WWAN NR n5	0.0105	0.014	
	WWAN NR n7	0.0057	0.0144	
	WWAN NR n12	0.0136	0.0205	
	WWAN NR n13	0.0155	0.0144	
	WWAN NR n14	0.0146	0.016	
	WWAN NR n25	0.0036	0.0151	
	WWAN NR n26	0.0211	0.027	
	WWAN NR n30	0.0065	0.0157	
	WWAN NR n41	0.0059	0.0157	
	WWAN NR n48	0.0033	0.0123	
	WWAN NR n66	0.0098	0.0269	
	WWAN NR n71	0.0217	0.0232	
	WWAN NR n77 (3700~3980MHz)	0.0043	0.0141	
	WWAN NR n78 (3450~3550MHz)	0.0037	0.0228	
	WWAN NR n41 UL MIMO	0.0061	0.0144	
	WWAN NR n48 UL MIMO (3550~3700MHz)	0.0034	0.0261	
	WWAN NR n77 UL MIMO (3700~3980MHz)	0.0057	0.0208	
	WWAN NR n78 UL MIMO (3450~3550MHz)	0.0057	0.0177	
	WWAN NR n41 (PC1.5)	0.0250	0.0257	
	WWAN NR n77 (PC1.5) (3450~3550MHz)	0.0239	0.0182	
	WWAN NR n77 (PC1.5) (3700~3980MHz)	0.0229	0.0254	

Test Item	Mode	ANT	RI7FN990A40HP Parent Worst Result	RI7FN990A28HP Variant Check Result	Difference (dB)
Radiated Spurious Emission (dBm)	WWAN 3G Band 2	0	-45.53	-43.66	1.87
	WWAN 3G Band 4	0	-47.21	-44.7	2.51
	WWAN 3G Band 5	0	-56.22	-53.3	2.92
	WWAN LTE Band 13	0	-59.99	-59.24	0.75
	WWAN LTE Band 14	0	-60.04	-59.74	0.3
	WWAN LTE Band 25	0	-46.13	-43.52	2.61
	WWAN LTE Band 26	0	-56.32	-53.52	2.8
	WWAN LTE Band 30	0	-58.86	-55.87	2.99
	WWAN LTE Band 41	2	-58.42	-55.44	2.98
	WWAN LTE Band 42 (3450~3550MHz)	3	-48.21	-47.41	0.8
	WWAN LTE Band 48 (3550~3700MHz)	3	-47.04	-44.58	2.46
	WWAN LTE Band 71	0	-57.48	-55.61	1.87
	WWAN LTE CA 5B	0	-55.88	-58.43	-2.55
	WWAN LTE CA 7C	0	-42.42	-39.57	2.85
	WWAN LTE CA 66C	0	-46.85	-44.35	2.5
	WWAN NR n5 (EN-DC 2A-n5A)	2+0	-56.6	-53.82	2.78
	WWAN NR n7	0	-51.3	-54.27	-2.97
	WWAN NR n12 (EN-DC 2A-n12A)	2+0	-47.03	-49.73	-2.7
	WWAN NR n13	0	-59.08	-59.46	-0.38
	WWAN NR n14	0	-58.01	-59.42	-1.41
	WWAN NR n25 (EN-DC 48A-n25A)	3+0	-52.68	-55.33	-2.65
	WWAN NR n25 (EN-DC 12A-n25A)	0+2	-52.82	-55.74	-2.92
	WWAN NR n26	0	-53.21	-53.91	-0.7
	WWAN NR n30 (EN-DC 5A-n30A)	0+2	-50.71	-53.26	-2.55
	WWAN NR n41 (EN-DC 25A-n41A)	0+2	-48.65	-51.36	-2.71
	WWAN NR n41 UL MIMO	2+0	-50.12	-47.88	2.24
	WWAN NR n48	3	-47.44	-49.84	-2.4
	WWAN NR n48 UL MIMO (3550~3700MHz)	3+1	-48.1	-50.98	-2.88
	WWAN NR n66	0	-54.38	-57.11	-2.73
	WWAN NR n66 (EN-DC 5A-n66A)	0+2	-54.15	-57.11	-2.96
	WWAN NR n71 (EN-DC 66A-n71A)	2+0	-57.89	-55.52	2.37
	WWAN NR n77 (3700~3980MHz)	3	-27.41	-29.85	-2.44
	WWAN NR n77 UL MIMO (3700~3980MHz)	3+1	-27.67	-29.75	-2.08
	WWAN NR n41 (PC1.5)	2+0	-38.98	-38.44	0.54
	WWAN NR n77 (PC1.5) (3450~3550MHz)	3+1	-32.35	-32.49	-0.14
	WWAN NR n77 (PC1.5) (3700~3980MHz)	3+1	-33	-33.56	-0.56

Conclusion:

Spot check test against the variant model based on the worst and representative condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

The spot check emission level is not degraded more than 3dB, and the emission level is compliant, data referencing is justified according to the guidance in the KDB inquiry.

4. Reference detail Section

Rule Part	Equipment Class	Wireless Technology	Frequency Band (MHz)	Reference FCC ID (Parent)	Type Grant/ Permissive Change	Reference Title	FCC ID Filling (Variant)
22, 24, 27, 90, 96	PCB CBE	3G	2/4/5	RI7FN990A40HP	Original Grant	FG270608A	RI7FN990A28HP
		LTE	2/4/5/7/12/13/14/17/25/26/30/38/41/42/43/48/66/71 UL CA 2C/5B/7C/38C/41C/42C/43C/48C/66B/66C	RI7FN990A40HP	Original Grant	FG270608B FG270608D FG270608E FG270608G FG270608J FG270608K FG270608M	RI7FN990A28HP
		NR	n2/n5/n7/n25/n30/n38/n41/n48/n66/n71/n77/n78 UL MIMO n38/n41/n48/n77/n78	RI7FN990A40HP	Original Grant	FG270608C FG270608F FG270608H FG270608I FG270608L FG220821001	RI7FN990A28HP
		NR	n7/n12/n13/n14/n25/n26/n30/n38/n41/n48/n66/n71/n77/n78 UL MIMO n38/n41/n48/n77/n78	RI7FN990A40HP	Original Grant	FG270608-10A FG270608-10B	RI7FN990A28HP
		NR	PC1.5 n41/n77/n78	RI7FN990A40HP	Original Grant	FG270608-14	RI7FN990A28HP

5. List of Measuring Equipment

<Radiation for FCC Part 22, 24, 27, 90, 96 >

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Feb. 23, 2024	May 04, 2024~ Jun. 11 2024	Feb. 22, 2025	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	37059 & 01	30MHz~1GHz	Nov. 03, 2023	May 04, 2024~ Jun. 11 2024	Nov. 02, 2024	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02114	1GHz~18GHz	Jul. 31, 2023	May 04, 2024~ Jun. 11 2024	Jul. 30, 2024	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 24, 2023	May 04, 2024~ Jun. 11 2024	Nov. 23, 2024	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 02, 2023	May 04, 2024~ Jun. 11 2024	Oct. 01, 2024	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 22, 2024	May 04, 2024~ Jun. 11 2024	May 21, 2025	Radiation (03CH12-HY)
Preamplifier	E-INSTRUMENT TECH LTD.	ERA-100M-18G-56-01-A70	EC1900249	1GHz-18GHz	Dec. 20, 2023	May 04, 2024~ Jun. 11 2024	Dec. 19, 2024	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 27, 2023	May 04, 2024~ Jun. 11 2024	Jun. 26, 2024	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Jan. 10, 2024	May 04, 2024~ Jun. 11 2024	Jan. 09, 2025	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-900-1000-15000-60SS	SN12	1GHz High Pass Filter	Sep. 11, 2023	May 04, 2024~ Jun. 11 2024	Sep. 10, 2024	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN2	3GHz High Pass Filter	Mar. 12, 2024	May 04, 2024~ Jun. 11 2024	Mar. 11, 2025	Radiation (03CH12-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN2	6.75GHz High Pass Filter	Mar. 12, 2024	May 04, 2024~ Jun. 11 2024	Mar. 11, 2025	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803951/2	9kHz~30MHz	Mar. 05, 2024	May 04, 2024~ Jun. 11 2024	Mar. 04, 2025	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 18, 2023	May 04, 2024~ Jun. 11 2024	Dec. 17, 2024	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Dec. 18, 2023	May 04, 2024~ Jun. 11 2024	Dec. 17, 2024	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	803953/2	30MHz~40GHz	Dec. 18, 2023	May 04, 2024~ Jun. 11 2024	Dec. 17, 2024	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP210117	N/A	Oct. 19, 2023	May 04, 2024~ Jun. 11 2024	Oct. 18, 2024	Radiation (03CH12-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	May 04, 2024~ Jun. 11 2024	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	May 04, 2024~ Jun. 11 2024	N/A	Radiation (03CH12-HY)
Radio Communication Analyze	Anritsu	MT8821C	6261849015	N/A	Nov. 17, 2023	May 04, 2024~ Jun. 11 2024	Nov. 16, 2024	Radiation (03CH12-HY)
Radio Communication Test Station	Anritsu	NT8000A	6272337370	N/A	Nov. 14, 2023	May 04, 2024~ Jun. 11 2024	Nov. 13, 2024	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	May 04, 2024~ Jun. 11 2024	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	May 04, 2024~ Jun. 11 2024	N/A	Radiation (03CH12-HY)

<Conducted for FCC Part 22, 24, 27, 90, 96>

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
DC Power Supply	GW Instek	GPE2323	GET910884	0V~64V ;0A~6A	Nov. 16, 2023	May 29, 2024~ Jun. 06, 2024	Nov. 15, 2024	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~4A	Sep. 12, 2023	May 15, 2024	Sep. 11, 2024	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101905	10Hz~40GHz	Jul. 14, 2023	May 29, 2024~ Jun. 06, 2024	Jul. 13, 2024	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 20, 2023	May 15, 2024	Sep. 19, 2024	Conducted (TH03-HY)
Signal Analyzer	Rohde & Schwarz	FSV3044	101049	10Hz~44GHz	Sep. 26, 2023	May 29, 2024~ Jun. 06, 2024	Sep. 25, 2024	Conducted (TH03-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 04, 2023	May 29, 2024~ Jun. 06, 2024	Sep. 03, 2024	Conducted (TH03-HY)
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Aug. 06, 2023	May 15, 2024	Aug. 05, 2024	Conducted (TH03-HY)
Radio Communication Analyzer	Anritsu	MT8821C	6262025353	LTE FDD/TDD LTE-2CC DLCA/ULCA	Oct. 03, 2023	May 30, 2024~ May 31, 2024	Oct. 02, 2024	Conducted (TH03-HY)
Radio Communication Test Station	Anritsu	MT8000A	6272337370	N/A	Nov. 14, 2023	May 29, 2024~ Jun. 06, 2024	Nov. 13, 2024	Conducted (TH03-HY)
Hygrometer	TECPEL	DTM-303B	TP210073	N/A	Jun. 26, 2023	May 29, 2024~ Jun. 06, 2024	Jun. 25, 2024	Conducted (TH03-HY)

Note: Test equipment calibration is traceable to the procedure of ISO17025.