

Data Referencing Plan

Justification of Test Data Referencing, for EMC/RF and SAR

- Reference model: FCC ID: ROR2002
- Variant model: FCC ID: ROR2001

According to KDB 484596 D01 Referencing Test Data v03

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1. Product Overview

Radio	FCC Rule Part	FCC ID: ROR2002	FCC ID: ROR2001
5G FR1 Band: n48, n77, n78	Part 27, 96	Supported	Supported
Wi-Fi, 2.4, 5, 6 GHz	Part 15	Supported	Not Supported
GPS	N/A	Supported	Supported

2. Antenna Diagram

FCC ID: ROR2002 (Reference Model)	FCC ID: ROR2001 (Variant model)
	

3. Exterior View

The device form factor, the size of display area and the housing material is identical.

FCC ID: ROR2002 (Reference Model)	FCC ID: ROR2001 (Variant Model)
	

4. Antenna Diagram

FC ID: ROR2002: Antenna		FC ID: ROR2001: Antenna
Antenna No.	Band support	Band support
Antenna 1	NR_Band 48/77/78 TRX4	NR_Band 48/77/78 TRX4
Antenna 2	NR_Band 48/77/78 TRX4	NR_Band 48/77/78 TRX4
Antenna 3	NR_Band 48/77/78 TRX4	NR_Band 48/77/78 TRX4
Antenna 4	NR_Band 48/77/78 TRX4	NR_Band 48/77/78 TRX4
Antenna 5	WiFi 2.4GHz TRX2	Not Supported
Antenna 6	WiFi 2.4GHz TRX2	Not Supported
Antenna 7	WiFi 5GHz TRX2	Not Supported
Antenna 8	WiFi 5GHz TRX2	Not Supported
Antenna 9	WiFi 6GHz TRX2	Not Supported
Antenna 10	WiFi 6GHz TRX2	Not Supported

5. Comparison – Summary

5.1 Identical

FCC ID : ROR2002, FCC ID : ROR2001 are identical in the followings:

- The device form factor, the size of display area and the housing material is identical
- Enclosure and material
- PCB Layout

5.2 Difference:

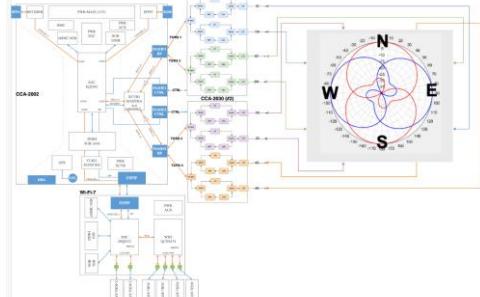
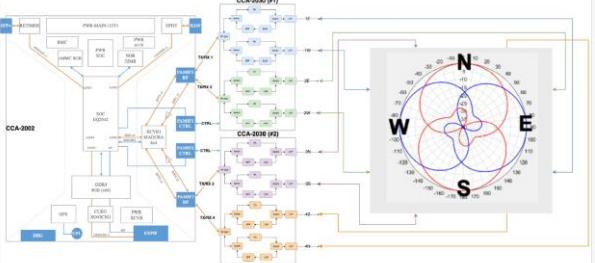
FCC ID ROR2001 (Variant model) is different from FCC ID ROR2002 (Reference model), in the followings:

- RF bandings support are changed, including their corresponding matching
 1. Not support bands:
WIFI 2.4, 5, 6GHz
 - ❖ Hardware not supported bands:
WIFI 2.4, 5, 6GHz

6. Main board Schematic difference between NA and Row :

FCC ID: ROR2002 (Reference Model)	FCC ID: ROR2001 (Variant Model)
N/A	

7. Block Diagram differences:

FCC ID ROR2002	FCC ID ROR2001
1. Remove WIFI module	
	

8. BOM differences:

The BOM key components differences between FCC ID ROR2002 and FCC ID ROR2001

Commodity	FCC ID: ROR2002 (Reference Model)	FCC ID: ROR2001 (Variant Model)	Vendor Part number
5G NR Dual PA 3GHz	Y	Y	BRD-2030-B01
Module, WLAN, RF Front-End, 802.11be (WiFi 7), 2.4GHz, LGA-16	Y	N	SKY85358-11
Module, WLAN, RF Front-End, 802.11be (WiFi 7), 5GHz, MCM-16	Y	N	SKY85797-11
Module, WLAN, RF Front-End, 802.11be (WiFi 7), 6GHz, MCM-16	Y	N	SKY85798-11

9. PCB Layout:

FCC ID ROR2002 and FCC ID ROR2001 use same PCB

		FCC ID ROR2002	FCC ID ROR2001
WWAN	Module	EQ2542	
	Component on PCB	Same	
	Antenna	Same	
WLAN 2.4GHz	IC	IPQ5322	NA
	Component on PCB	Yes	NA
	Antenna	Yes	NA
WIFI 5G/6G	IC	QCN9274	NA
	Component on PCB	Yes	NA
	Antenna	Yes	NA

10. Test Strategy

- FCC ID ROR2002: reference model, full test for EMC/RF.
- FCC ID ROR2001: variant model, data referencing from the reference model for EMC/RF.
 - Identical design parts: Spot check the worst cases in FCC ID ROR2002
 - EMC/RF spot check justification:
Reference KDB484596 D01 Referencing Test Data v03
Verify the Worst-Case Configuration of the Reference Model, do spot check
Conducted power test and radiated spurious emission test against the variant
model based on the worst-case condition from the original model was performed in
this filing to demonstrate the test data from original model remains representative
for the variant model.

For EMC, the spot-check measurements that meet the following criteria:

- a) Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, may show a deviation ddB from the reference data no larger than 3 dB (applicable for both field and power quantities):
$$ddB = | VdB - RdB | \leq 3 \text{ dB}$$
where between VdB , the variant spot-check level in dB, and RdB is the corresponding measurement level in dB for the reference model.
- b) An alternative to the limit of eq. (1) is available, and is based on considering how far the reference data RdB is from the compliance threshold CdB (also expressed in dB), for the particular test under consideration. In this case, if $MdB = |CdB - RdB|$ is the margin in dB from the compliance limit, a spot check may be considered acceptable when the deviation ddB from the reference data satisfies the following condition:
$$ddB = | VdB - RdB | \leq (3 + MdB / 20) \text{ dB} , \text{ for } 0 \leq MdB \leq 60 \text{ dB}$$
$$ddB = | VdB - RdB | = 6 \text{ dB} , \quad \text{for } MdB > 60 \text{ dB}$$
- a) When using the option in eq. (2), ddB increases linearly from 3 dB to 6 dB -for $MdB = 0$ dB, then $ddB = 3$ dB, that is when RdB is right at the compliance threshold CdB , thus the margin $dB = 0$ and the variant can only be allowed to go lower than RdB);-for $MdB = 60$ dB, then $ddB = 6$ dB, i.e., the reference model data is 60 dB below the compliance threshold MdB .

For RF Exposure, the spot-check measurements that meet the following criteria:

$$dTER = | TER_v - TER_R | / TER_R$$

and the acceptance criterion for the spot-check on the variant will be:

$$dTER \leq dTER_{max}$$

The value of $dTER_{max}$, the maximum $dTER$ allowed for the spot-check to be deemed acceptable, is established based on the compliance margin M corresponding to the worst-case test scenario (i.e., the most challenging from the compliance perspective) for the parent model. The margin M is defined as

$$M = TER_T - TER_R = 1 - TER_R$$

where TER_T is the TER corresponding to the compliance threshold, which is always $TER_T = 1$. For instance, for a general population evaluation, $SAR \leq 1.6$ W/kg, as required for any compliant measurement. Thus, since $TER = SAR/1.6$, and $0 \leq TER \leq 1$, then M in eq. (7) will always be a positive number because TER_R cannot be larger than 1 for the parent model to be complaint.

The threshold $dTER_{max}$ is defined as function of the margin M to provide values between 25% and 50%, linearly increasing between $M = 0.5$ (50% of the compliance limit) and $M = 0.75$ (75% of the compliance limit), in accordance with the following expression:

$$d_{TER_{max}}(M) = \begin{cases} 0.25 & , \text{ for } 0 \leq M < 0.5 \\ M - 0.25 & , \text{ for } 0.5 \leq M < 0.75 \\ 0.5 & , \text{ for } 0.75 \leq M \end{cases}$$

- Compliance is determined by both the spot check data and the referenced test data.
- Test strategy is tabulated in next page

	Test case	Reference model	Variant model
FCC ID		FCC ID ROR2002	FCC ID ROR2001
Part 27,96 5G NR	Effective (Isotropic) Radiated Power Output Data Peak-Average Ratio Bandwidth Band Edge Compliance Spurious emissions at antenna terminals Field strength of spurious radiation Frequency stability	Full Test	selections verify the worst frequency bands and worst channels of the reference model (FCC ID ROR2002) and do spot check power & RSE.
Part 15C For 2.4G WLAN	6dB Bandwidth 99% Bandwidth Peak Output Power Power Spectral Density Conducted Band Edges and Spurious Emission Radiated Band Edges and Spurious Emission AC Conducted Emission	Full Test	Not Supported
Part 15E For 5G WLAN	26dB & 99% Bandwidth Maximum Conducted Output Power Power Spectral Density Unwanted Emissions DFS AC Conducted Emission	Full Test	Not Supported
Part 15E For 6G WLAN	26dB Emission Bandwidth 99% Occupied Bandwidth Maximum Conducted Output Power Fundamental Maximum EIRP Fundamental Power Spectral Density In-Band Emissions (Channel Mask) Contention Based Protocol Unwanted Emissions AC Conducted Emission	Full Test	Not Supported