

Data referencing for different Product

1. Test Data Referencing

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

Parent model: FCC ID: 2AACZ-M440A01 for M440A01

Variant model: FCC ID: 2AACZ-M440A02 for M440A02.

Revision:

Version	Description	Date
1.0	Initial release	2025/9/2

2. Product Overview

Radio	Frequency band	FCC Rule Part	FCC ID: 2AACZ-M440A01 (M440A01)	FCC ID: 2AACZ-M440A02 (M440A02)
LTE Band	2, 4, 5, 7, 12, 13,14, 17, 25, 26, 30, 38, 41, 42,43,48, 66,71	Part 22, 24, 27, 90, 96	Supported	Supported
5G NR	n2, n5, n7, n12, n14, n25, n30, n38, n41, n48, n66, n71, n77, n78	Part 22, 24, 27, 90, 96	Supported	Supported
Wi-Fi	2.4GHz: 2.400 – 2.4845GHz 5GHz: 5.15 – 5.35GHz, 5.47 – 5.725GHz, 5.725 – 5.85GHz	Part 15C&E	Supported	Supported
Bluetooth BR&EDR &BLE	2.4GHz: 2.400 – 2.4835GHz	Part 15C	Supported	Supported
NFC	13.56MHz	Part 15C	Supported	Supported

3. The differences between M440A02(Variant model) and M440A01(Parent model) :

All components, RF parameters, software and hardware versions are the same as original product, except for below differences:

1. Change the battery from MBP440AA01/MBP440BA01 to MBP440AA02/MBP440BA02.
2. The resistance on the SI signal has been adjusted from 560 Ω /1.1K Ω to 0, and the relevant SI signal has been optimized

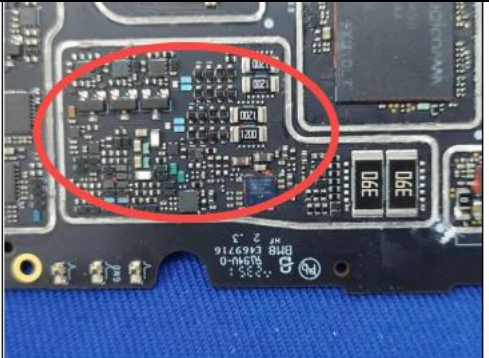
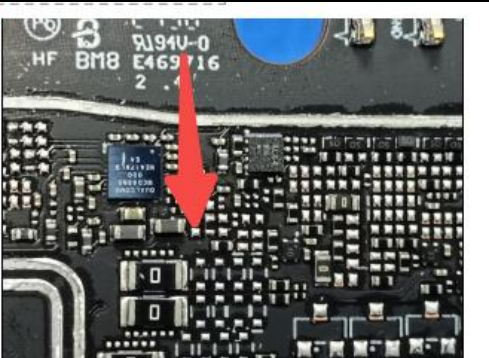
Parent Device:

Placement	IS		
	Description	vendor	vendor part number
R229,R230,R3316,R3322,R3325,R3326,R3340,R3375,R3377,R3380,R3384,R3386,R3389,R3392,R3394,R3397,R3520,R3522,R3539,R3542,R3546,R3623,R3629,R3660,R3677,R3688,R7009,R7012,R7015,R7018,R7020,R7022,R7024,R7027,R7069,R7089,R7223,R7229,R7412,R7433,R7566,R7568,R7569,R7575,R7577,R7578,R7579,R10259,R10262,R10265,R10268,R10271,R10274,R12694,R12700,R12726,R222,R223,R225,R226,R3315,R3320,R3321,R3323,R3324,R3327,R3328,R3338,R3339,R3373,R3378,R3381,R3382,R3385,R3390,R3393,R3396,R3399,R3521,R3523,R3524,R3525,R3538,R3540,R3541,R3543,R3544,R3545,R3666,R7007,R7008,R7010,R7011,R7013,R7014,R7016,R7017,R7019,R7021,R7023,R7087,R7088,R7221,R7222,R7227,R7228,R7471,R7473,R7475,R7476,R7477,R7478,R7556,R10257,R10258,R10260,R10261,R10263,R10264,R10266,R10267,R10269,R10270,R10272,R10273,R12690,R12692,R12696,R12698,R12704,R12706,R12708,R12709,R12710,R12711,R12727,R12728,R12729,R12730,R12731	RES,560 Ω , $\pm$ 1%,1/8W,0402	YAGEO	RC0402FR-7W560RL
R7224,R7225,R7230,R7231,R12691,R12693,R12697,R12699,R7226,R7232,R12695,R12701	RES,1.1K Ω , $\pm$ 1%,1/8W,0402	YAGEO	RC0402FR-7W1K1L

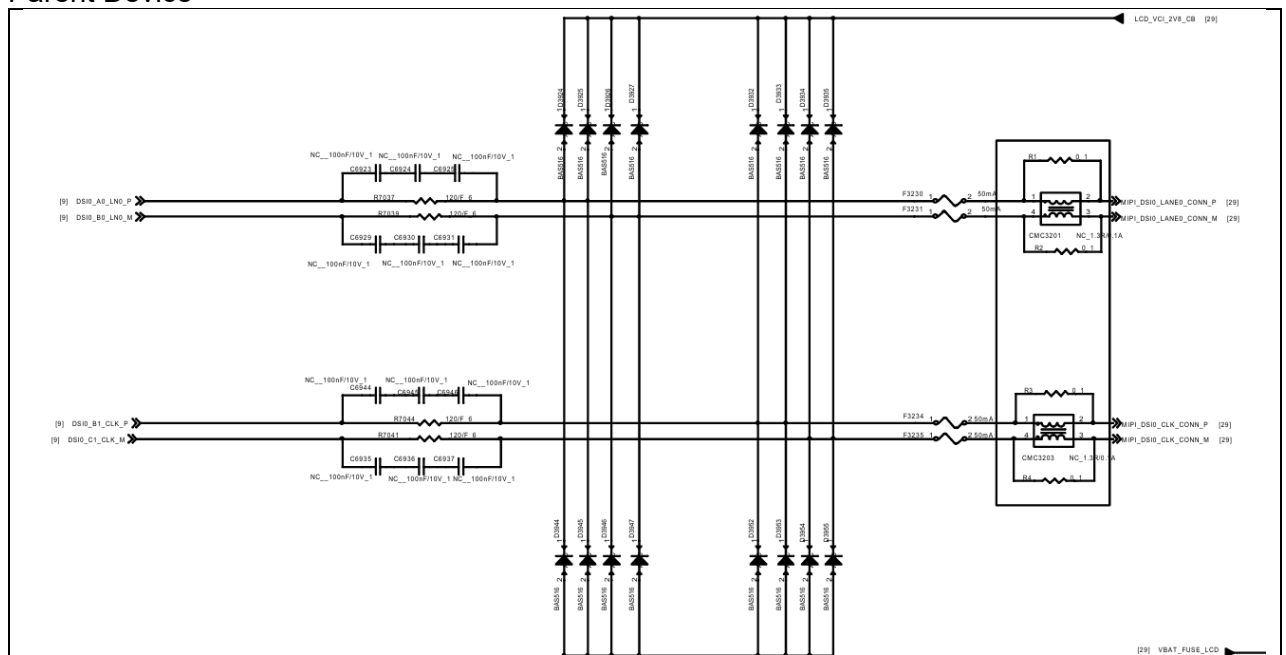
Variant Device

Placement	RG		
	Description	vendor	vendor part number
R229,R230,R3316,R3322,R3325,R3326,R3340,R3375,R3377,R3380,R3384,R3386,R3389,R3392,R3394,R3397,R3520,R3522,R3539,R3542,R3546,R3623,R3629,R3660,R3677,R3688,R7009,R7012,R7015,R7018,R7020,R7022,R7024,R7027,R7069,R7089,R7223,R7229,R7412,R7433,R7566,R7568,R7569,R7575,R7577,R7578,R7579,R10259,R10262,R10265,R10268,R10271,R10274,R12694,R12700,R12726,R222,R223,R225,R226,R3315,R3320,R3321,R3323,R3324,R3327,R3328,R3338,R3339,R3373,R3378,R3381,R3382,R3385,R3390,R3393,R3396,R3399,R3521,R3523,R3524,R3525,R3538,R3540,R3541,R3543,R3544,R3545,R3666,R7007,R7008,R7010,R7011,R7013,R7014,R7016,R7017,R7019,R7021,R7023,R7087,R7088,R7221,R7222,R7227,R7228,R7471,R7473,R7475,R7476,R7477,R7478,R7556,R10257,R10258,R10260,R10261,R10263,R10264,R10266,R10267,R10269,R10270,R10272,R10273,R12690,R12692,R12696,R12698,R12704,R12706,R12708,R12709,R12710,R12711,R12727,R12728,R12729,R12730,R12731	RES,0 Ω , $\pm$ 5%,1/16w,0402	YAGEO	RC0402JR-070RL
R7224,R7225,R7230,R7231,R12691,R12693,R12697,R12699,R7226,R7232,R12695,R12701	RES,0 Ω , $\pm$ 5%,1/16w,0402	YAGEO	RC0402JR-070RL

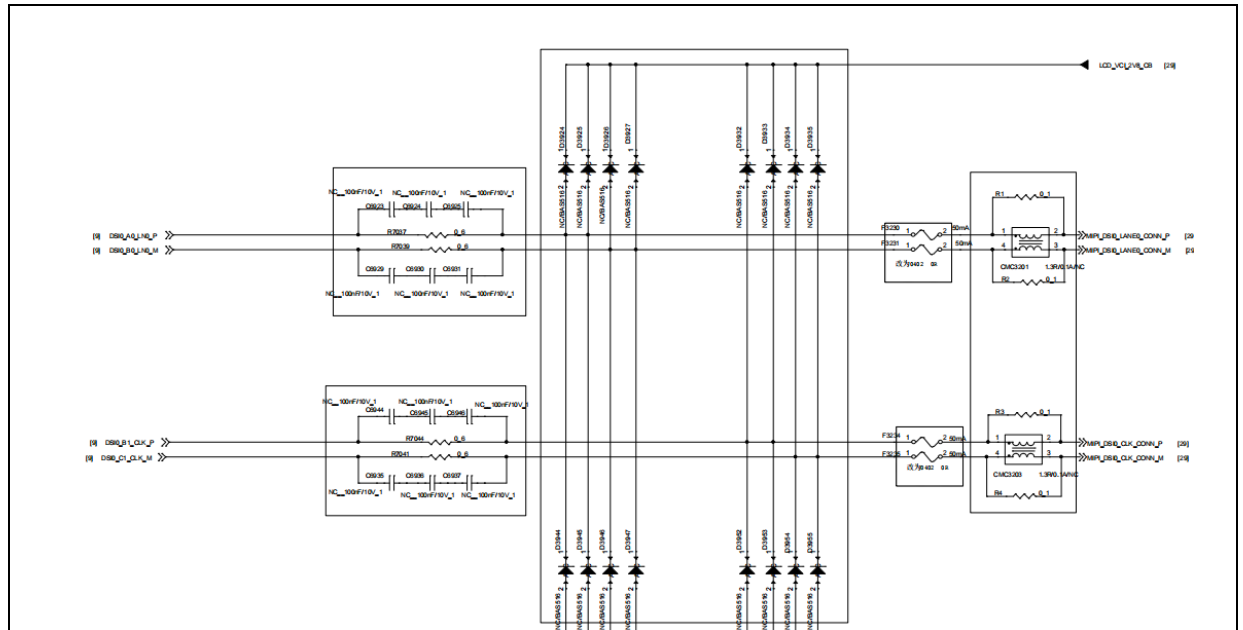
3. Remove the high-speed switch diode from the screen signal (pull it up to the power or ground)

Parent Device	Variant Device
 This micrograph shows a section of a smartphone motherboard. A red circle highlights a cluster of components, including a large integrated circuit (IC) and several smaller surface-mount components. The board is populated with various electronic components, and the text 'HF B18 E469716' is visible on the right side of the image.	 This micrograph shows a different section of a smartphone motherboard. A red arrow points to a specific component, which appears to be a small IC or capacitor. The board is densely packed with components, and the text 'HF B18 E469716' is visible on the left side of the image.

Parent Device



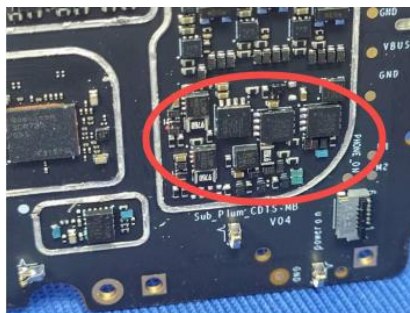
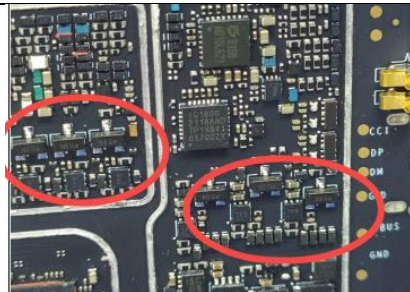
Variant Device



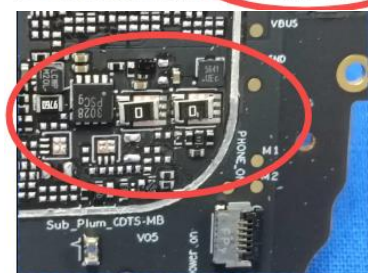
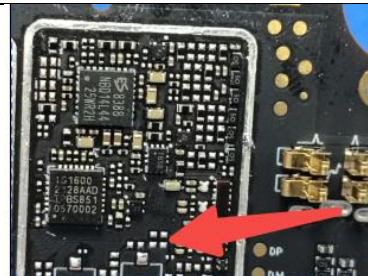
4. NFC matching has been optimized and adjusted by software

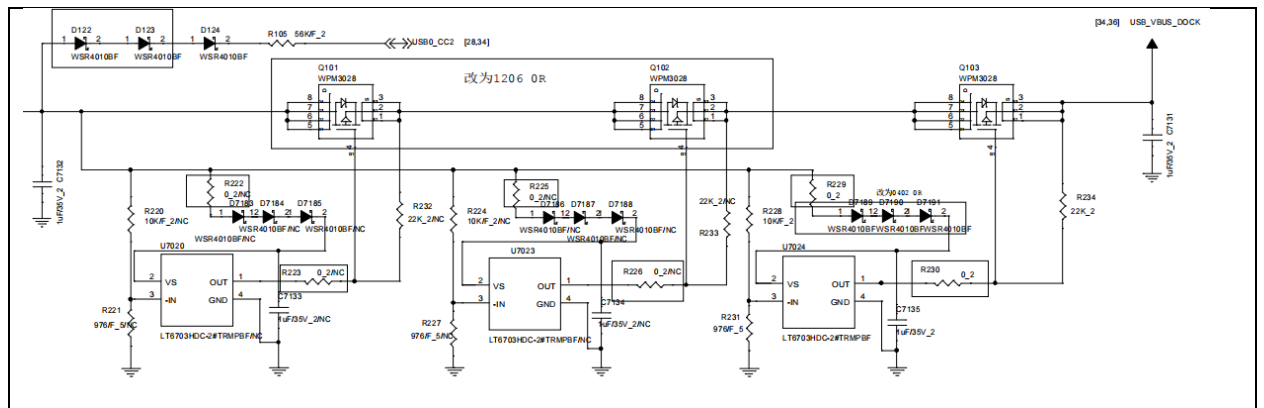
5. Simplify or delete the voltage sensor circuit

Parent Device:



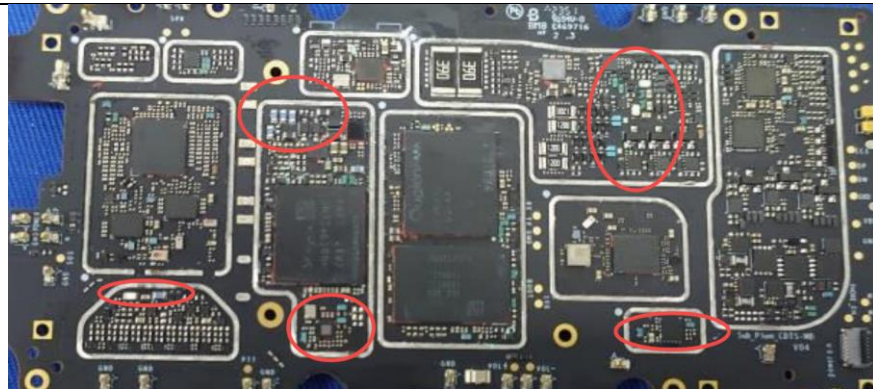
Variant Device:



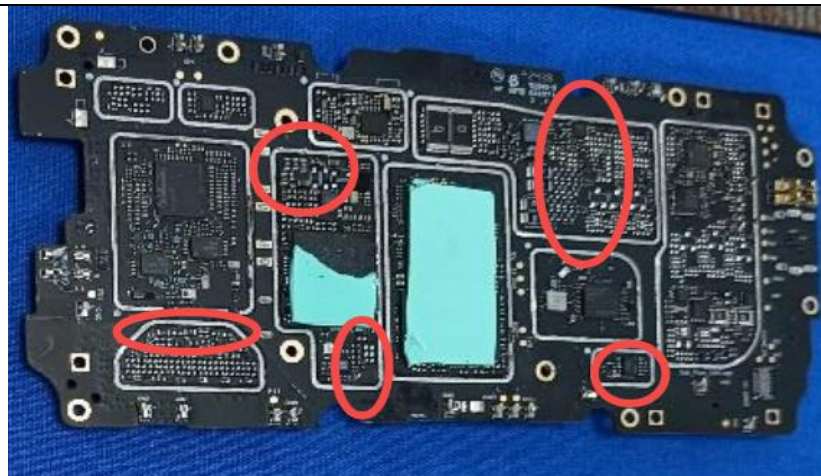


6. Replace the current limiting fuse with a 0R resistor

Parent
Device:



Variant
Device:



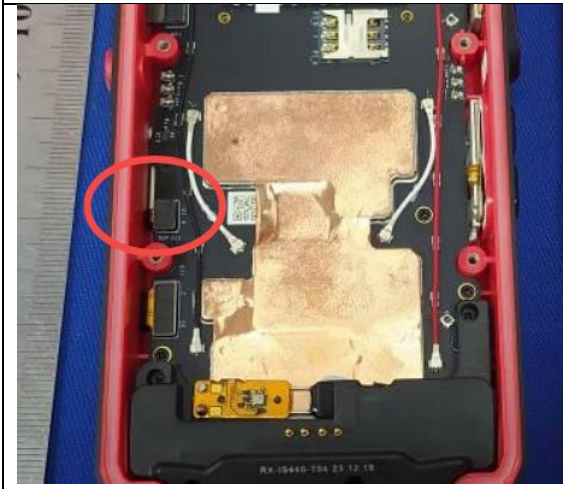
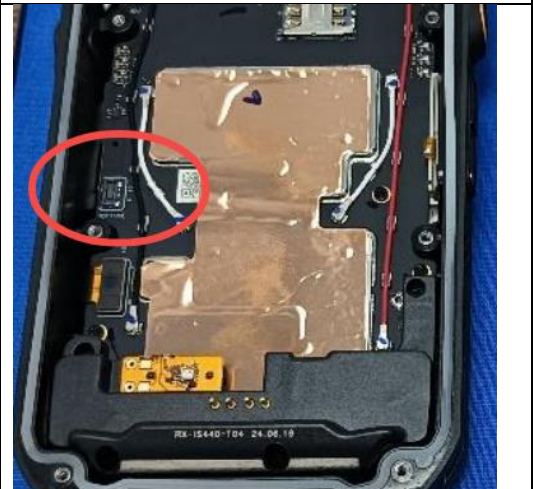
Parent Device:

Placement	IS		
	Description	vendor	vendor part number
F3309	FUSE, 0435.375KRHF, 375mA, 32V, 0.193Ω	LITTELFUSE	0435.375KRHF
F6802,F6803,F6906,F6907,F6931,F6932,F6934,F6935,F6937,F6938	FUSE,F0402G0R02FNTR,28mA,32V,7.5Ω	AVX	F0402G0R02FNTR
F0616,F0617,F0801,F1702,F1704,F3640,F3643,F3727,F3743,F4301,F6923,F6924,F6940,F6941,F6944	FUSE,F0402G0R15FNTR,0.15A,32V,1.2Ω	AVX	F0402G0R15FNTR
F0601,F0602,F1701,F2101,F2102,F3009,F3220,F3222,F3230,F3231,F3234,F3235,F3509,F3510,F3721,F4130,F5601,F6201,F6920,F6921,F6925,F6929,F6930,F6933,F6943	FUSE,F0402G0R05FNTR,50mA,32V,3.4Ω	AVX	F0402G0R05FNTR
F3250,F4201	FUSE,F0402G0R07FNTR,75mA,32V,2Ω	AVX	F0402G0R07FNTR
F4305,F4306,F4307,F6928,F6942	FUSE,0603FA500-R,500mA,32V,1.025Ω	Eaton	0603FA500-R
F4303	FUSE,0603FA750-R,750mA,32V,0.45Ω	Eaton	0603FA750-R

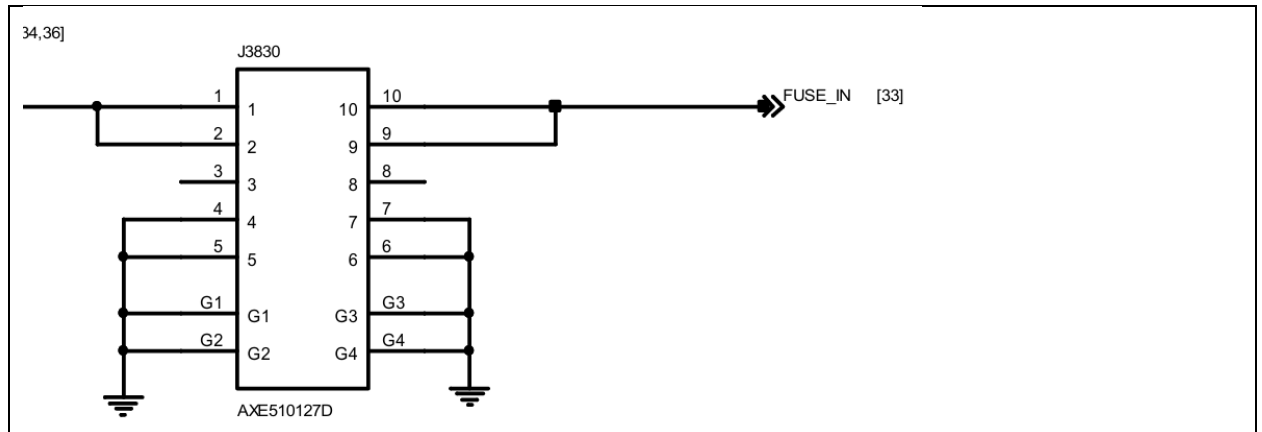
Variant Device:

Placement	RG		
	Description	vendor	vendor part number
F3309	RES,0Ω,±5%,1/16w,0402	YAGEO	RC0402JR-070RL
F6802,F6803,F6906,F6907,F6931,F6932,F6934,F6935,F6937,F6938	RES,0Ω,±5%,1/16w,0402	YAGEO	RC0402JR-070RL
F0616,F0617,F0801,F1702,F1704,F3640,F3643,F3727,F3743,F4301,F6923,F6924,F6940,F6941,F6944	RES,0Ω,±5%,1/16w,0402	YAGEO	RC0402JR-070RL
F0601,F0602,F1701,F2101,F2102,F3009,F3220,F3222,F3230,F3231,F3234,F3235,F3509,F3510,F3721,F4130,F5601,F6201,F6920,F6921,F6925,F6929,F6930,F6933,F6943	RES,0Ω,±5%,1/16w,0402	YAGEO	RC0402JR-070RL
F3250,F4201	RES,0Ω,±5%,1/16w,0402	YAGEO	RC0402JR-070RL
F4305,F4306,F4307,F6928,F6942	RES,0Ω,±5%,1/10w,0603	UNIOHM	0603WAJ0000T5E
F4303	RES,0Ω,±5%,1/10w,0603	UNIOHM	0603WAJ0000T5E

7. Disconnected the battery VBAT_SUSE enable (distinguish battery)

Parent Device:	Variant Device:
	

Parent Device:



Variant Device:

The New design delete this connector,then can distinguish battery.

Except for the above-mentioned modification, all the other portions remain unchanged.

4. Test Strategy

- FCC ID: 2AACZ-M440A01 as reference model to conduct full test for EMC, RF, SAR.
- FCC ID: 2AACZ-M440A02 as Variant model data referencing from the reference model for RF and SAR additional NFC/EMC testing.

➤ EMC/RF/SAR spot check justification:

Reference KDB484596 D01 Referencing Test Data v02r01

- Verify the Worst-Case Configuration of the Reference Model, do spot check conducted power and RSE.
- For every exposure condition (head, body, etc) and for every transmit antenna and frequency band, spot check SAR at the highest SAR configuration found in the referenced mode. The spot-check measurements that meet the following criteria:

- Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, may show a deviation d_{dB} from the reference data no larger than 3 dB (applicable for both field and power quantities):

$$d_{dB} = |V_{dB} - R_{dB}| \leq 3 \text{ dB} \quad , (1)$$

where between V_{dB} , the variant spot-check level in dB, and R_{dB} is the corresponding measurement level in dB for the reference model.

- An alternative to the limit of eq. (1) is available, and is based on considering how far the reference data R_{dB} is from the compliance threshold C_{dB} (also expressed in dB), for the particular test under consideration. In this case, if $M_{dB} = |C_{dB} - R_{dB}|$ is the margin in dB from the compliance limit, a spot check may be considered acceptable when the deviation d_{dB} from the reference data satisfies the following condition:

$$d_{dB} = |V_{dB} - R_{dB}| \leq (3 + M_{dB}/20) \text{ dB} \quad , \text{ for } 0 \leq M_{dB} \leq 60 \text{ dB} \quad . (2)$$

$$d_{dB} = |V_{dB} - R_{dB}| = 6 \text{ dB} \quad , \text{ for } 0 \leq M_{dB} \leq 60 \text{ dB}$$

When using the option in eq. (2), d_{dB} increases linearly from 3 dB to 6 dB (as shown in Fig. 2):

- for $M_{dB}=0$ dB, then $d_s=3$ dB, that is when R_{dB} is right at the compliance threshold C_{dB} , thus the margin $M_{dB}=0$ and the variant can only be allowed to go lower than R_{dB} ;
- for $M_{dB}=60$ dB, then $d_s=6$ dB, i.e., the reference model data is 60 dB below the compliance threshold M_{dB} .

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

Parent Device	Variant Device
FCC ID : 2AACZ-M440A01	FCC ID: 2AACZ-M440A02
Fully test	Spot-check

Rule Part	Test item	Data Reference(Y/N)	Spot-check test
Part 22, 24, 27, 90,96 LTE, 5G NR	Conducted Output Power	Verify power	
	Effective Radiated Power &Equivalent Isotropic Radiated Power	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Peak-to-Average Ratio	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Occupied Bandwidth	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Conducted Band Edge Measurement	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Conducted Spurious Emission	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Frequency Stability Temperature & Voltage	Y	Verify each one of 4G ,5G max ERP&EIRP channel
	Radiated Spurious Emission	Verify RSE worse case	
Part 15C For BT2.0	Number of Channels	Y	Verify one mode max power Number of Channels
	Hopping Channel Separation	Y	Verify one mode max power Number of Channels
	Dwell Time of Each Channel	Y	Verify one mode max power Number of Channels
	20dB Bandwidth	Y	Verify one mode max power Channel

	99% Bandwidth	Y	Verify one mode max power Channel
	Peak Output Power	Verify power	
	Conducted Band Edges	Y	Verify one mode max power Channel
	Conducted Spurious Emission	Y	Verify one mode max power Channel
	Radiated Band Edges and Radiated Spurious Emission	Verify RSE worse case	
	AC Conducted Emission	N	Re-test
Part 15C For BLE & 2.4G WLAN	6dB Bandwidth	Y	Verify one mode max power Channel
	99% Bandwidth	Y	Verify one mode max power Channel
	Peak Output Power	Verify power	
	Power Spectral Density	Y	Verify one mode max power Channels
	Conducted Band Edges and Spurious Emission	Y	Verify one mode max power Channel
	Radiated Band Edges and Spurious Emission	Verify RSE worse case	
	AC Conducted Emission	N	Re-test
Part 15E For 5G WLAN	26dB & 99% Bandwidth	Y	Verify one mode max power Channel
	Maximum Conducted Output Power	Verify power	
	Power Spectral Density	Y	Verify one mode max power Channel
	Unwanted Emissions	Verify RSE worse case	
	DFS	Y	Verify MAX bandwidth channel
	AC Conducted Emission	N	Re-test
Part 15C For NFC	20dB Spectrum Bandwidth	N	Re-test
	99% OBW Spectrum Bandwidth	N	Re-test
	Frequency Stability	N	Re-test
	Field Strength of Fundamental Emissions	N	Re-test
	Radiated Spurious Emissions	N	Re-test

	AC Power Line Conducted Emissions	N	Re-test
Part 15B	AC Conducted Emission	N	Re-test
	Radiated Emission	N	Re-test
SAR	SAR Testing	Y	erify the each frequency band worst case per Head/Body/Hotspot/Extremity exposure conditions