

## APPENDIX K: POWER REDUCTION VERIFICATION

Per the May 2017 TCBC Workshop Notes, demonstration of proper functioning of the power reduction mechanisms is required to support the corresponding SAR configurations. The verification process was divided into two parts: (1) evaluation of output power levels for individual or multiple triggering mechanisms and (2) evaluation of the triggering distances for proximity-based sensors.

### K.1 Power Verification Procedure

The power verification was performed according to the following procedure:

1. A base station simulator was used to establish a conducted RF connection and the output power was monitored. The power measurements were confirmed to be within expected tolerances for all states before and after a power reduction mechanism was triggered.
2. Step 1 was repeated for all relevant modes and frequency bands for the mechanism being investigated.
3. Steps 1 and 2 were repeated for all individual power reduction mechanisms and combinations thereof. For the combination cases, one mechanism was switched to a 'triggered' state at a time; powers were confirmed to be within tolerances after each additional mechanism was activated.

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## K.2 Verification Summary

**Table K-1**  
**Power Measurement Verification for Main Antenna with RCV Active**

Mode/Band	Antenna	On Table	On Body	On Table	In Hand
		Measured Power (dBm)			
UMTS 850	Main 1	24.36	22.55	24.24	22.53
UMTS 1750	Main 2	23.32	18.42	23.28	18.42
UMTS 1900	Main 2	23.39	19.50	23.34	19.49
NR Band n41 PC2	Main 2	25.76	20.69	25.76	20.69
NR Band n41 PC3	Main 2	23.67	20.57	23.67	20.57
NR Band n41 (PC3, UL-MIMO)	Main 2	19.35	16.35	19.35	16.35
NR Band n77 DoD PC2	Main 1	25.80	20.47	25.80	20.47
NR Band n77 DoD PC3	Main 1	23.75	20.29	23.75	20.29
NR Band n77 DoD (PC3, UL-MIMO / SRS 2T4R)	Main 1	19.12	16.13	19.12	16.13
NR Band n77 PC2	Main 1	25.85	20.43	25.85	20.43
NR Band n77 PC3	Main 1	23.68	20.29	23.68	20.29
NR Band n77(PC3, UL-MIMO / SRS 2T4R)	Main 1	19.25	16.05	19.25	16.05

**Table K-2**  
**Power Measurement Verification for Main Antenna Body**

Mode/Band	Antenna	On Table	On Body	On Table	In Hand
		Measured Power (dBm)			
UMTS 850	Main 1	24.36	22.55	24.24	22.53
UMTS 1750	Main 2	23.32	18.42	23.28	18.42
UMTS 1900	Main 2	23.39	19.50	23.34	19.49
LTE Band 71	Main 1	23.67	21.63	23.70	21.61
LTE Band 12	Main 1	24.08	20.80	24.04	20.86
LTE Band 17	Main 1	24.12	21.04	24.17	21.07
LTE Band 13	Main 1	24.21	21.00	24.15	21.01
LTE Band 5	Main 1	24.40	21.12	24.39	21.08
LTE Band 4	Main 2	24.23	18.00	24.15	18.05
LTE Band 66	Main 2	24.28	18.14	24.24	18.10
LTE Band 2	Main 2	24.47	19.04	24.48	19.06
LTE Band 25	Main 2	24.12	18.93	24.20	18.90
LTE Band 30	Main 2	24.41	19.04	24.40	19.07
LTE Band 41	Main 2	23.27	19.23	23.26	19.15
LTE Band 38	Main 2	23.25	19.25	23.21	19.27
LTE Band 48	Main 1	23.14	18.94	23.13	18.96
NR Band n71	Main 1	24.50	22.60	24.50	22.60
NR Band n5	Main 1	24.20	21.80	24.20	21.80
NR Band n66	Main 2	23.50	18.50	23.50	18.50
NR Band n25	Main 2	23.70	19.20	23.70	19.20
NR Band n2	Main 2	23.70	18.60	23.70	18.60
NR Band n30	Main 2	22.10	18.05	22.10	18.05
NR Band n41 PC2	Main 2	25.80	19.70	25.80	19.70
NR Band n41 PC3	Main 2	23.70	19.60	23.70	19.60
NR Band n41 (PC3, UL-MIMO)	Main 2	19.38	16.22	19.38	16.22
NR Band n77 DoD PC2	Main 1	25.80	18.60	25.80	18.60
NR Band n77 DoD PC3	Main 1	23.75	18.66	23.75	18.66
NR Band n77 DoD (PC3, UL-MIMO / SRS 2T4R)	Main 1	19.16	16.15	19.16	16.15
NR Band n77 PC2	Main 1	25.90	18.30	25.90	18.30
NR Band n77 PC3	Main 1	23.70	18.36	23.70	18.36
NR Band n77(PC3, UL-MIMO / SRS 2T4R)	Main 1	19.51	16.43	19.51	16.43

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**Table K-3  
Power Measurement Verification for Sub Antenna with RCV Active**

Mode/Band	Antenna	On Table	On Body	On Table	In Hand
		Measured Power (dBm)			
LTE Band 12	Sub	23.51	19.50	23.50	19.44
LTE Band 17	Sub	23.71	19.67	23.75	19.61
LTE Band 13	Sub	23.77	19.54	23.72	19.53
LTE Band 5	Sub	24.02	19.82	24.00	19.80
NR Band n5	Sub	23.50	19.70	23.50	19.70
NR Band n41 (PC3, UL-MIMO)	Sub	19.38	16.30	19.38	16.30
NR Band n77 DoD PC2 AS-Div	Sub-UHB	21.40	12.97	21.40	12.97
NR Band n77 DoD PC3 AS-Div	Sub-UHB	19.17	12.93	19.17	12.93
NR Band n77 DoD (PC3, UL-MIMO / SRS 2T4R)	Sub-UHB	19.51	16.50	19.51	16.50
NR Band n77 PC2 AS-Div	Sub-UHB	21.61	13.43	21.61	13.43
NR Band n77 PC3 AS-Div	Sub-UHB	19.43	13.33	19.43	13.33
NR Band n77 (PC3, UL-MIMO / SRS 2T4R)	Sub-UHB	19.56	16.45	19.56	16.45

**Table K-4  
Power Measurement Verification for Sub Antenna Body**

Mode/Band	Antenna	On Table	On Body	On Table	In Hand
		Measured Power (dBm)			
LTE Band 12	Sub	23.56	21.43	23.56	21.44
LTE Band 17	Sub	23.77	21.60	23.72	21.61
LTE Band 13	Sub	23.69	21.57	23.78	21.59
LTE Band 5	Sub	24.04	21.85	24.08	21.87
LTE Band 48	Sub	23.84	17.33	23.79	17.30
LTE Band 66	Sub	22.70	15.80	22.70	15.80
LTE Band 2	Sub	23.10	14.90	23.10	14.90
LTE Band 30	Sub	23.40	15.50	23.40	15.50
NR Band n5	Sub	23.46	20.63	23.46	20.63
NR Band n41 (PC3, UL-MIMO)	Sub	19.56	16.36	19.56	16.36
NR Band n77 DoD PC2 AS-Div	Sub-UHB	21.40	13.37	21.40	13.37
NR Band n77 DoD PC3 AS-Div	Sub-UHB	19.17	13.01	19.17	13.01
NR Band n77 DoD (PC3, UL-MIMO / SRS 2T4R)	Sub-UHB	19.49	16.43	19.49	16.43
NR Band n77 PC2 AS-Div	Sub-UHB	21.61	13.56	21.61	13.56
NR Band n77 PC3 AS-Div	Sub-UHB	19.43	13.24	19.43	13.24
NR Band n77 (PC3, UL-MIMO / SRS 2T4R)	Sub-UHB	19.56	16.35	19.56	16.35

The device supports manufacturer's proprietary mechanism which can detect the motion of the device and then configure the DSI during portable use scenarios. Details of this mechanism can be found in the Operational Description. When the device is being used near the user, the device will detect motion and reduce the time-averaged output power of the main antenna. The motion detection operation was verified for two test cases, on-body and held in hand to represent conservative use cases for a handset devices, including head and body-worn scenarios.

The verification results are above. For the purposes of this evaluation, the Reserve\_power\_margin (Qualcomm Smart Transmit EFS entry) was set to 0dB, so that the EUT transmits continuously at P<sub>limit</sub> for DSI=2,3 when the mechanism was triggered.

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