ASUS TF300TL

Technical Description of

Power Reduction through

Proximity Sensor

APPLICANT	:	**ASUS**
DUT TYPE		**Tablet PC**
MODEL NAME	:	**TF300TL**
FCC ID	:	**MSQTF300TL**

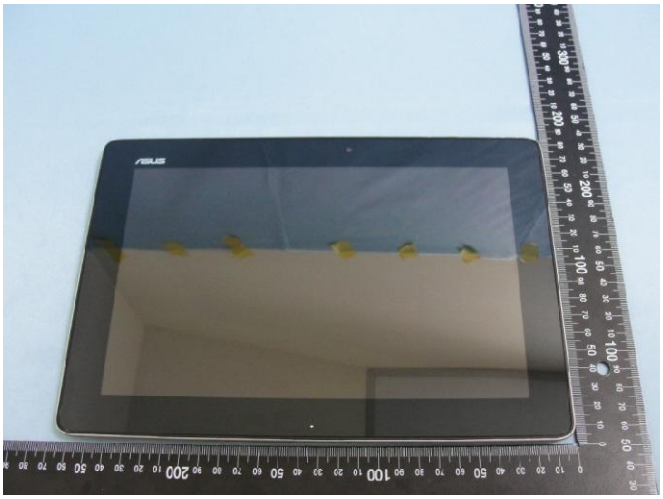
1. DUT Introduction (Product Information):

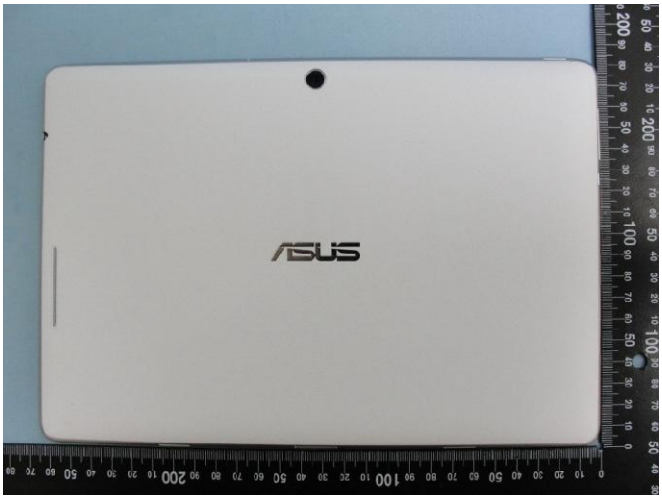
1.1 Product description

This is a tablet which can connect to internet through WWAN network, WLAN network and support the Bluetooth wireless transmission, GPS function.

1.2 DUT outlook

This is a device with 10” diagonal display that dimension is 26.5cm x 18.4cm x 1.0cm. The entire device diagonal distance is more than 20cm, therefore this a tablet (not a mini-tablet)
There is no display orientation limitation in EUT; that is all 4 orientations are supported.





1.3 Transmitter types

	MODE	Band
WWAN Antenna	2G	GPRS/EDGE: 850/900/1800/1900
	3G	UMTS: Band 1/2/4/5
		Uplink: HSPA+ Category 6 (only QPSK) Downlink: 1. Band 2/5: HSPA+ category 14 2. Band 1/4: DC-HSPA+ category 24
	LTE	Band 4/17 (BW: 5M/10MHz)
WLAN/BT Antenna	WLAN	2.4GHz 802.11 b/g/n
	Bluetooth	2.4GHz
Applicable Simultaneous Transmission Combination		
#1	**2G/3G + BT**	
#2	**LTE + BT**	
#3	**2G/3G + WLAN2.4G**	
#4	**LTE + WLAN2.4G**	

Note:

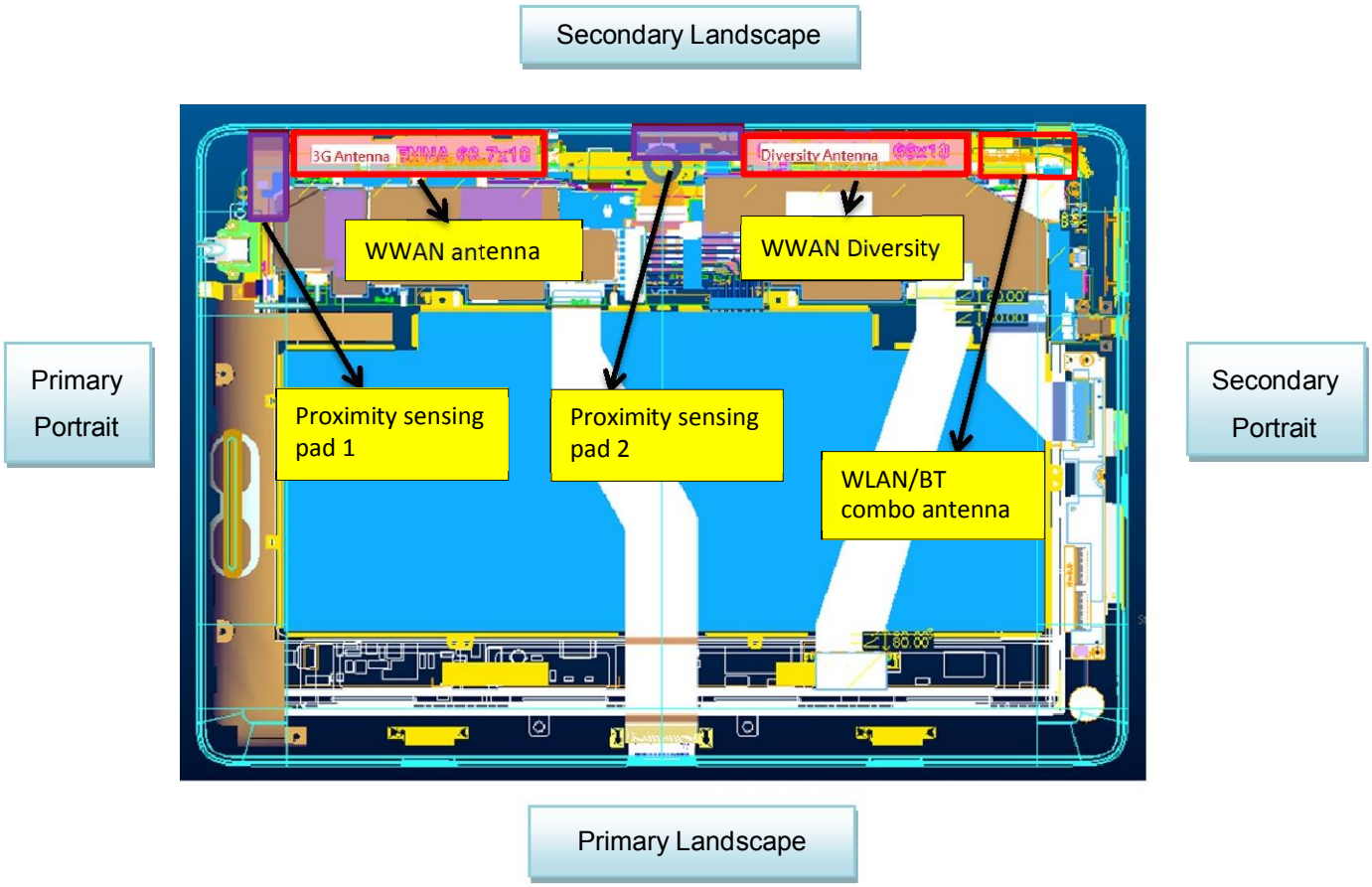
1. The LTE and 2G/3G share the same WWAN transmitting antenna, and LTE will not transmit simultaneously with 2G/3G.
2. The WLAN 2.4G and Bluetooth share the same WLAN/BT transmitting antenna, and WLAN 2.4G will not transmit simultaneously with Bluetooth.
3. This device support GPRS/EDGE 900/1800 MHz bands and UMTS band 1 that are not operational in U.S, therefore no data for those bands is presented in this document and in the test reports.

1.4 Summarized necessary items addressed in KDB 941225 D05 v01

FCC ID			MSQTF300TL	
EUT			ASUS Transformer PAD	
Operating Frequency Range of each LTE transmission band			Band 4: TX: 1712.5 MHz ~ 1752.5 MHz, RX: 2112.5 MHz ~ 2152.5 MHz Band 17: TX: 706.5 MHz ~ 713.5 MHz, RX: 736.5 MHz ~ 743.5 MHz	
Channel Bandwidth			Band 4: 5MHz, 10MHz Band 17: 5MHz, 10MHz	
Transmission (H, M, L) channel numbers and frequencies in each LTE band				
Band 4				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19975	1712.5	20000	1715
M	20175	1732.5	20175	1732.5
H	20375	1752.5	20350	1750
Band 17				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Frequency (MHz)	Channel #	Frequency (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711
UE category, uplink modulations used			Category 3, QPSK, and 16QAM	
LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)			WWAN Antenna: LTE share the antenna with GPRS/EDGE/UMTS.	
LTE Voice / Data requirements			Data only	
LTE MPR permanently built-in by design			Yes	
LTE A-MPR			Disabled during SAR testing. With CMW500, set NS value to NS_01 to disable A-MPR.	
LTE maximum averaged conducted output power			LTE Band 17: 23.55 dBm LTE Band 4: 23.23 dBm	
Other U.S. wireless operating modes / bands			GPRS/EDGE	GSM850: UL:824.2~848.8MHz; DL:869.2~893.8MHz PCS : UL:1850.2~1909.8MHz; DL:1930.2~1989.8MHz
			WCDMA HSDPA / HSUPA	Band V: UL: 826.4~846.6MHz; DL: 871.4~891.6MHz Band II: UL: 1852.4~1907.6MHz; DL: 1932.4~1987.6MHz Band IV: UL: 1712.4~1752.6MHz; DL: 2112.4~2152.6MHz
			WLAN	2.4G: 2412~2462 MHz
			Bluetooth	2402~2480 MHz
Simultaneous transmission configurations			WWAN+WLAN, WWAN+BT	
Power reduction applied to satisfy SAR compliance			Yes, proximity sensor.	

2. Sensor Design:

2.1 Sensor Pad & Antenna location— Rear view



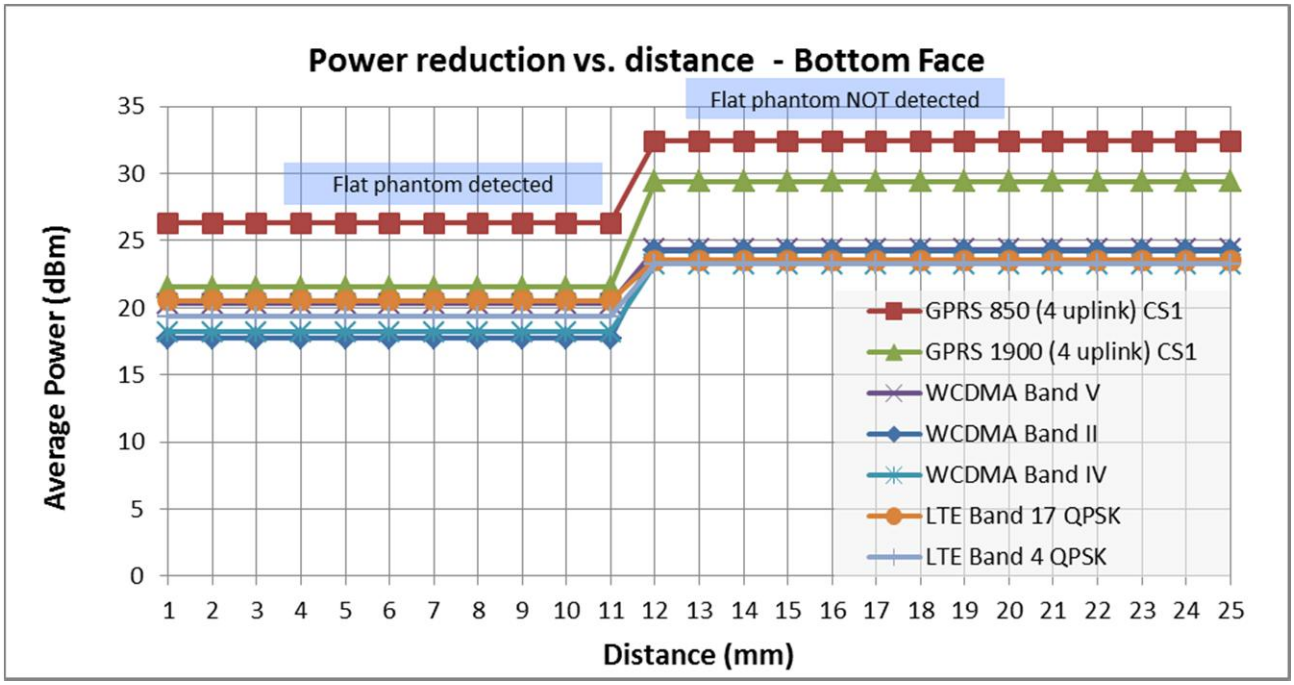
Power reduction applied for each wireless mode and orientation

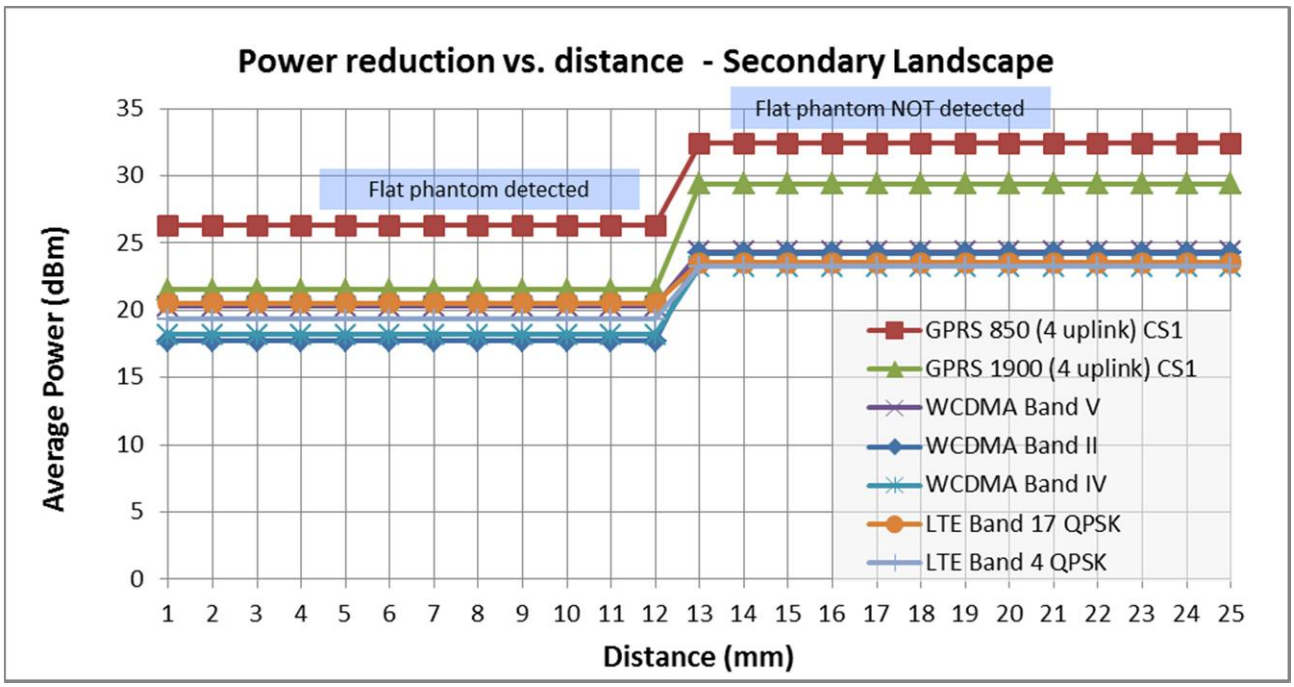
Exposure Position / wireless mode	UMTS Band V	UMTS Band IV	UMTS Band II	LTE Band 17	LTE Band 4
Bottom Face	#	#	#	#	#
Primary-Landscape	##	##	##	##	##
Secondary-Landscape	#	#	#	#	#
Primary-Portrait	##	##	##	##	##
Secondary-Portrait	##	##	##	##	##
#: Reduced maximum limit applied by activation of proximity sensor. ##: Normal Output power without reduction.					

Note: WLAN, BT output power is not reduced for SAR compliance.

Target Power reduction specifications:

Mode(s) of Operation	GPRS/EDGE 850	GPRS/EDGE 1900	UMTS Band 5	UMTS Band 2	UMTS Band 4	LTE Band 17	LTE Band 4
Bottom Face	6dB	8dB	4dB	6.5dB	5dB	3dB	4dB
Secondary Landscape	6dB	8dB	4dB	6.5dB	5dB	3dB	4dB





Remark:

1. GPRS 850 class 12, CH128. Full power: 32.42dBm, Reduced power: 26.31dBm. The power reduction level is 6.11dB.
2. GPRS 1900 class 12, CH810. Full power: 29.40dBm, Reduced power: 21.53dBm. The power reduction level is 7.87dB.
3. WCDMA Band V Ch4132. Full power: 24.35dBm, Reduced power: 20.27dBm. The power reduction level is 4.08dB.
4. WCDMA Band II Ch9400. Full power: 24.23dBm, Reduced power: 17.72dBm. The power reduction level is 6.51dB.
5. WCDMA Band IV Ch1513. Full power: 23.26dBm, Reduced power: 18.18dBm. The power reduction level is 5.08dB.
6. LTE Band 17 QPSK Ch23780. Full power: 23.55dBm, Reduced power: 20.55dBm. The power reduction level is 3.00dB.
7. LTE Band 4 QPSK Ch20175. Full power: 23.23dBm, Reduced power: 19.34dBm. The power reduction level is 3.89dB

2.2 Sensor IC Technical Description:

1) Sensor Operation theory

The principle of operation for proximity sensor is based on the changing of the capacitance. A capacitance exists between any reference point and ground as long as they are electrically isolated. If this reference point is a sensing electrode, it can help to think of it as a capacitor. The positive electrode of the capacitor is the sensing electrode, and the negative electrode is formed by the surrounding area.

The following figure shows the image of the capacitance changing.

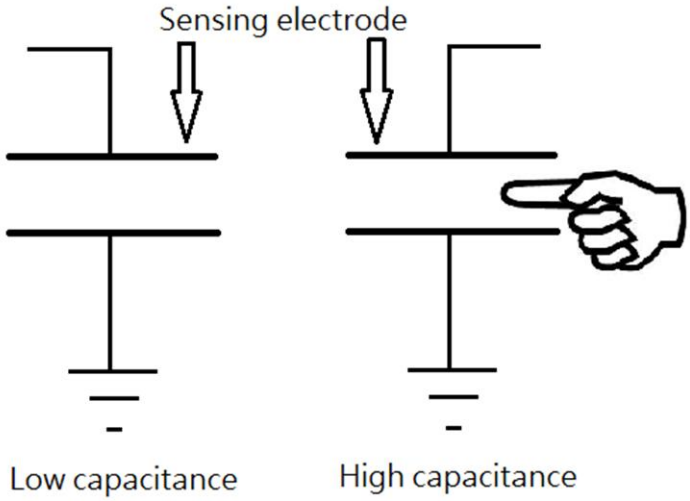


Figure 2.1 Sensing theory

When a conductive object is brought into proximity of the sensing electrode, coupling appears between them, and the capacitance of the sensing electrode relative to ground increases. For example, a human hand raises the capacitance of the sensing electrode as it approaches it. Touching the dielectric panel that protects the electrode increases its capacitance significantly.

2) Sensor IC Overview

The IQS128 ProxSense™ IC is a fully integrated capacitive sensor implementing Dynamic Calibration (DYCAL™) technology: intelligent hysteresis to allow for sensor drift even during sensor activation. The IQS128 is a single channel capacitive proximity and touch device which employs an internal voltage regulator and reference capacitor (Cs). The IQS128 device has a dedicated pin for the connection of a sense antenna (Cx) and output pin for proximity and touch events on OUT. The polarity of the output pins can be configured. A 1-wire open drain data streaming protocol is implemented for debugging purposes. Special device configuration can be done by setting one time programmable (OTP) options. The device automatically tracks slow varying environmental changes via various signal processing algorithms and has an Automatic Antenna Tuning Implementation (Auto-ATI) algorithm to calibrate the device to the sense antenna. DYCAL™ (Dynamic Calibration) is a special form of hysteresis that can track slow varying environmental change even while the sensor is in a touch state.

3) Operation

The device has been designed to be used in applications where proximity is required and touch conditions can prevail for an extended period of time which may result in uncompensated drift in conventional capacitive sensors. A low threshold is used to detect the proximity of an object, with a higher threshold for touch detection. Dynamic Calibration is performed when a TOUCH condition is detected for longer than $T_{DYNACAL}$. The hysteresis algorithm will now check for the release condition of the touch, while still tracking environmental changes.

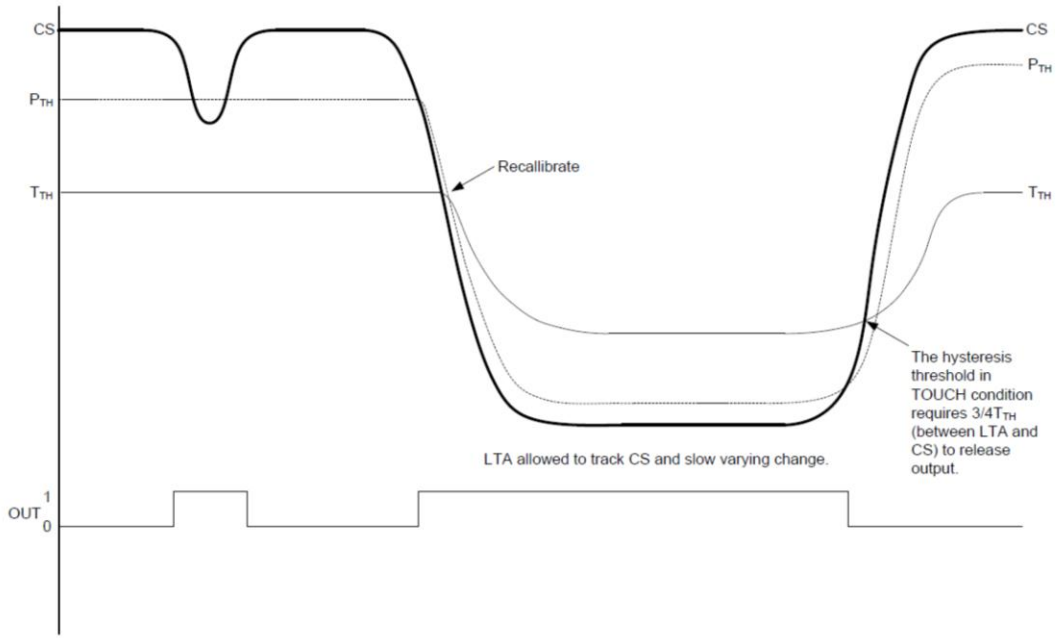


Figure 2.2 DYCAL Operation

4) Operating Principle

Figure 2.2 is a visual representation of the implemented functionality. The OUT pin is used to indicate the status of both a proximity and a touch event. The OUT pin is activated on the successful detection of a proximity event and will remain activated for the duration of the proximity event, permitting that this event is no longer than the filter halt timings. As soon as a touch condition is detected, the controller will dynamically re-calibrate its filter values to this new state, allowing its filters to track slow varying environmental changes, while still detecting the touch condition. A release threshold of ¾ x T_{TH} needs to be exceeded for the TOUCH detection to stop, where after the OUT pin will return to its original state.

5) Proximity Threshold

The IQS128 has 4 proximity threshold settings indicated in counts. The proximity threshold is selected by the designer to obtain the desired sensitivity and noise immunity. A proximity event is triggered if the CS diverges more than the selected count from the LTA for 8 consecutive cycles.

6) Touch Threshold

The IQS128 has 8 touch threshold settings indicated in counts. The touch threshold is selected by the designer to obtain the desired touch sensitivity. A touch event is triggered if the CS diverges more than

the selected count from the LTA for 2 consecutive cycles. In the NO-TOUCH state the CS must diverge more than the touch threshold value below the LTA. Operating in the TOUCH STATE, the CS must diverge more than ¾ of the touch threshold value above the LTA. The following equation is used to determine if a touch or release event occurred. NO TOUCH STATE: LTA – CS <= T_{THR} TOUCH STATE: CS - LTA >= ¾T_{THR}

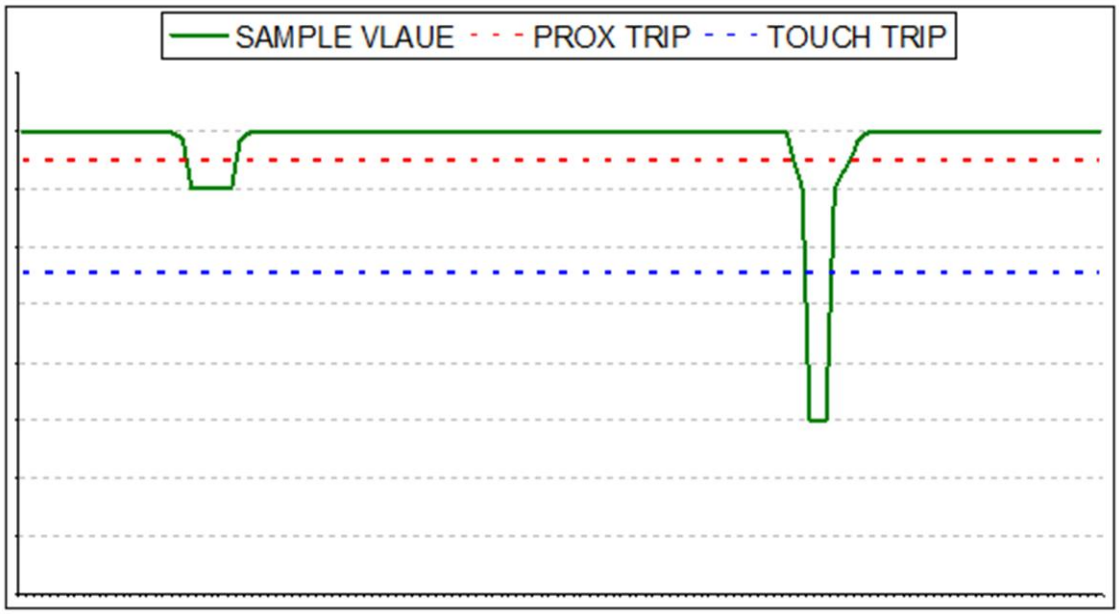
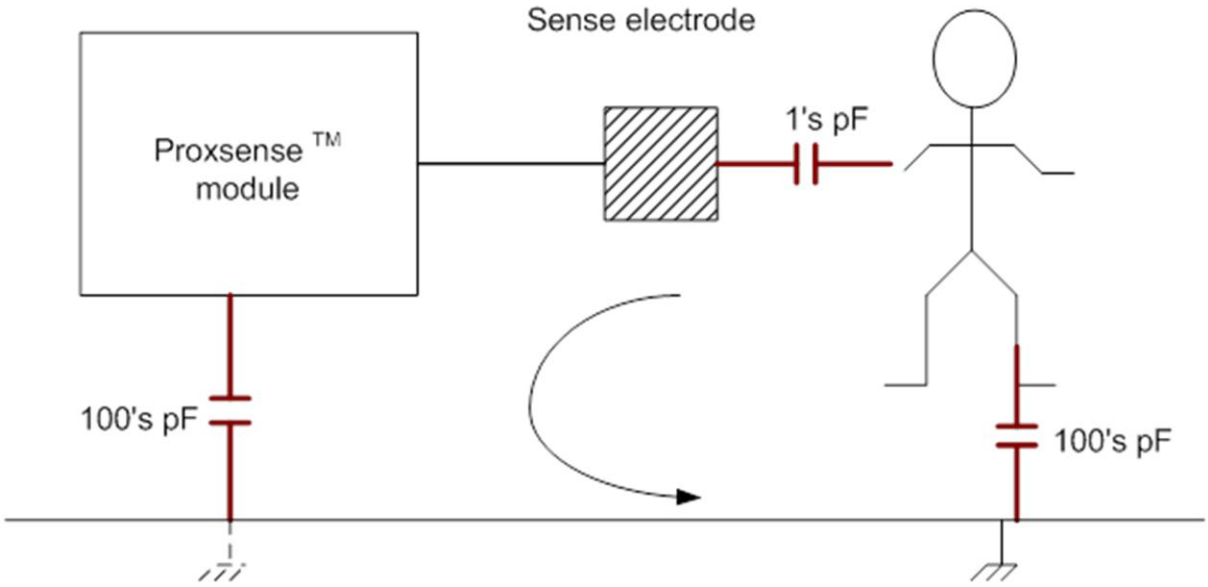


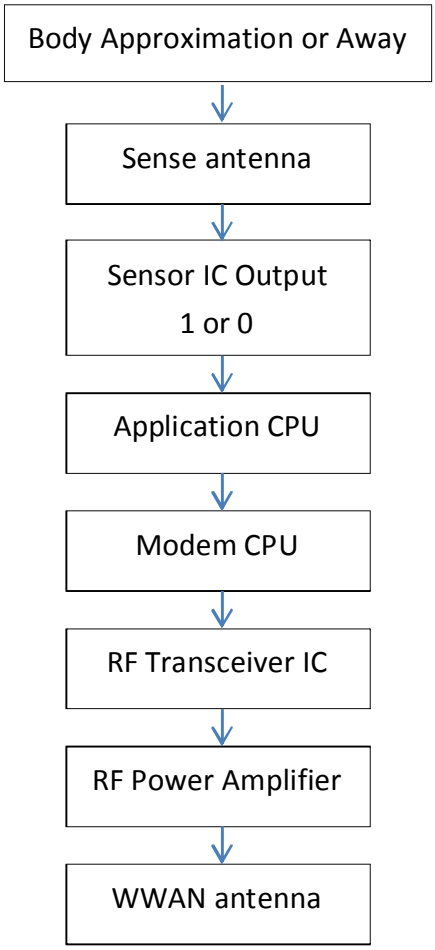
Figure 2.3 Sensing Threshold Filtering

7) Grounding Effects



If no physical connection exists between ground and the ProxSense module, improve coupling by using a large ground plane. Electrically connected devices have better PROXIMITY and TOUCH sensitivity.

8) Power Reduction Flow



Note:

The proximity sensor status and power reduction command will be updated every 100 msec.

2.3 Sensor Trigger Distance

<Sensor Trigger distance testing – Bottom Face>: From Contact to Far

1. Place the whole device under the phantom, with Bottom Faced to the flat phantom, at a separation of 0mm.
2. Gradually move the device outward the flat phantom, in perpendicular direction.
3. Record the distance between EUT and the flat phantom, when proximity sensor starts to be NOT triggered.
4. The trigger distance result is 12 mm for sensor around main antenna.

<Sensor Trigger distance testing – Bottom Face>: From Far to Contact

1. Place the whole device under the phantom, with Bottom Faced to the flat phantom, at a separation of 15mm.
2. Gradually move the device toward the flat phantom, in perpendicular direction.
3. Record the distance between EUT and the flat phantom, when proximity sensor starts to be triggered.
4. The trigger distance result is 11 mm for sensor around main antenna.

<Sensor Trigger distance testing – Secondary Landscape>: From Contact to Far

1. Place the whole device under the phantom, with Secondary Landscape faced to the flat phantom, at a separation of 0mm.
2. Gradually move the device outward the flat phantom, in perpendicular direction.
3. Record the distance between EUT and the flat phantom, when proximity sensor starts to be NOT triggered.
4. The trigger distance result is 13 mm for sensor around main antenna.

<Sensor Trigger distance testing –Secondary Landscape>: From Far to Contact

1. Place the whole device under the phantom, with Secondary Landscape faced to the flat phantom, at a separation of 15mm.
2. Gradually move the device toward the flat phantom, in perpendicular direction.
3. Record the distance between EUT and the flat phantom, when proximity sensor starts to be triggered.
4. The trigger distance result is 12 mm for sensor around main antenna.

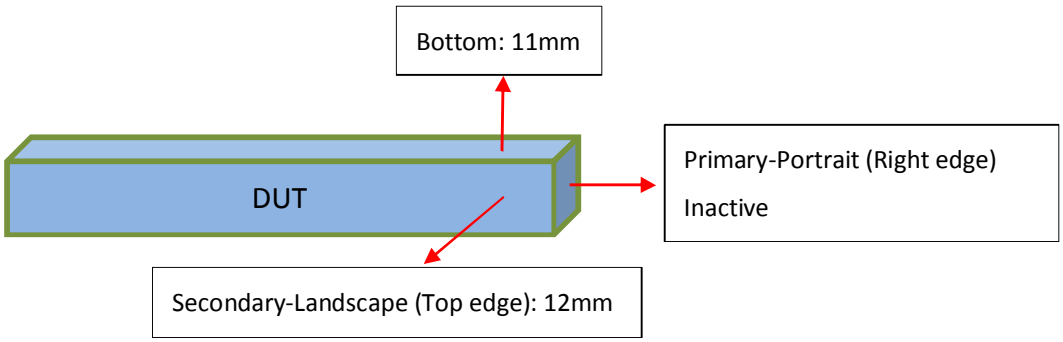


Figure 2.4 Sensor trigger distance

Distance from body		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P-Sensor Activation	Bottom Face	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off	Off	Off
	Secondary Landscape	On	On	On	On	On	On	On	On	On	On	On	On	On	Off	Off	Off

Note:

1. The Proximity Sensor has multi input channels; therefore the power reduction level for Bottom Face and for Secondary Landscape position can be set individually.
2. The sensor detection/trigger capability would be determined based on the worst case between “From Far to Contact” and “From Contact to Far”.
3. Concerning conservative evaluation, SAR evaluation at 10mm, with DUT full power, will be performed.
4. Concerning conservative evaluation, SAR evaluation at 11mm, with DUT full power, will be performed.

2.4 Sensing Coverage Area

DUT was setup away from the flat phantom at the target sensor-triggering distance outside the bottom of the flat phantom from the beginning, gradually and horizontally moved to the bottom of the phantom. The test setup photos shows the corresponding distance to DUT edges at the triggering time, and the resulting coverage area as shown in the diagram in the next pages.

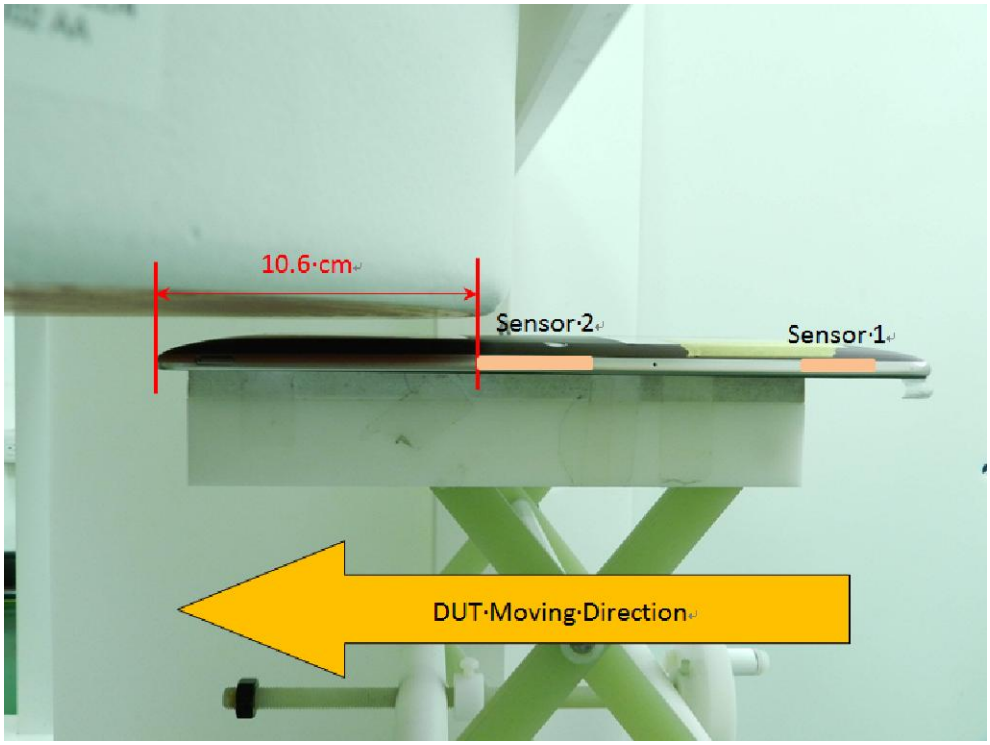


Figure: Bottom face distance to edge (First time triggering)

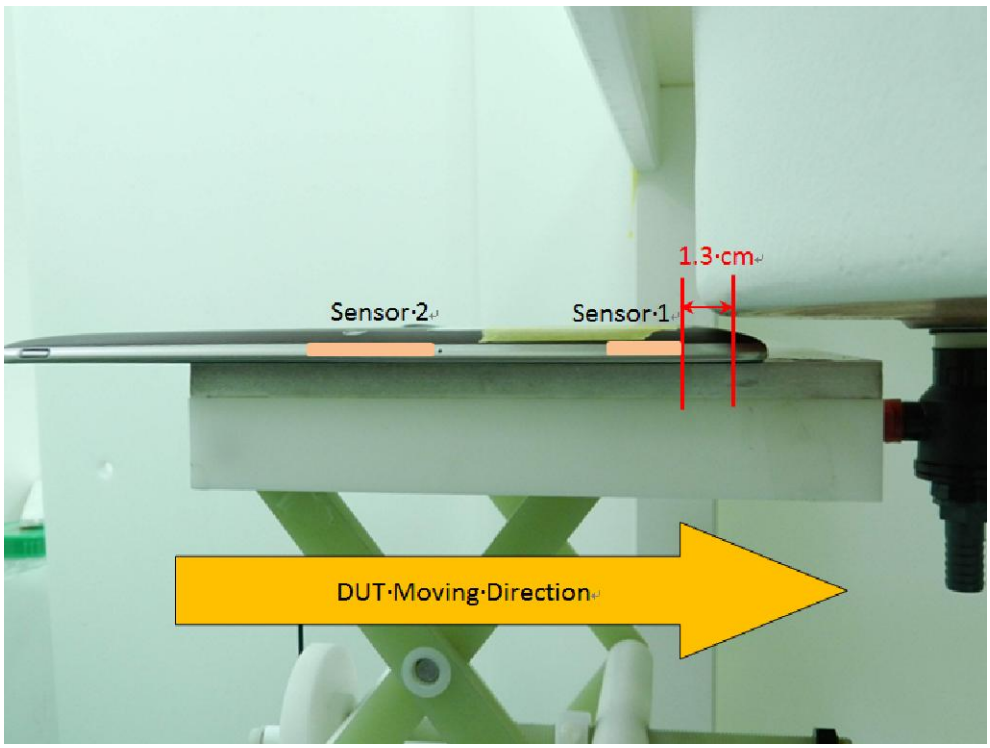


Figure: Bottom face distance to edge (First time triggering)

< **Sensing Coverage Area – Bottom Face** >

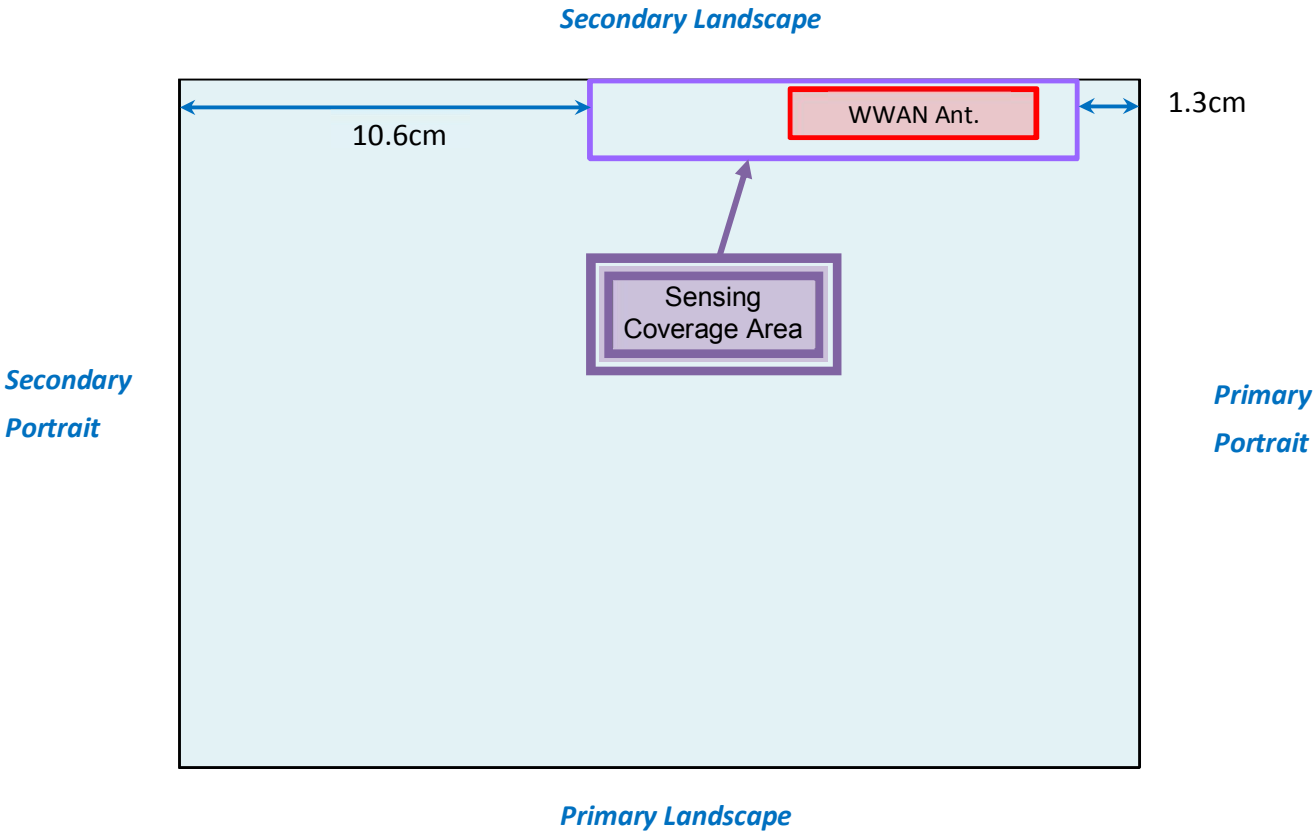


Figure: Front face view of coverage area

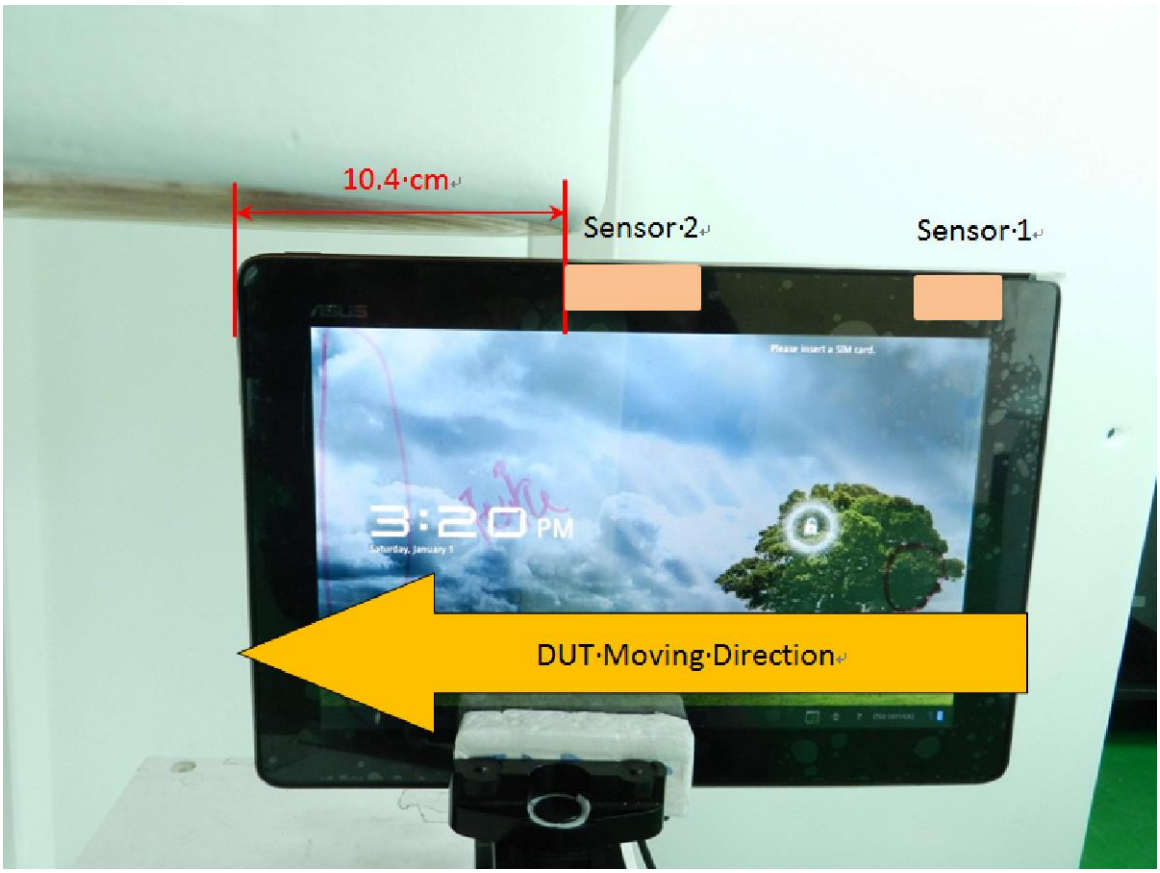


Figure: Secondary Landscape distance to edge (First time triggering)

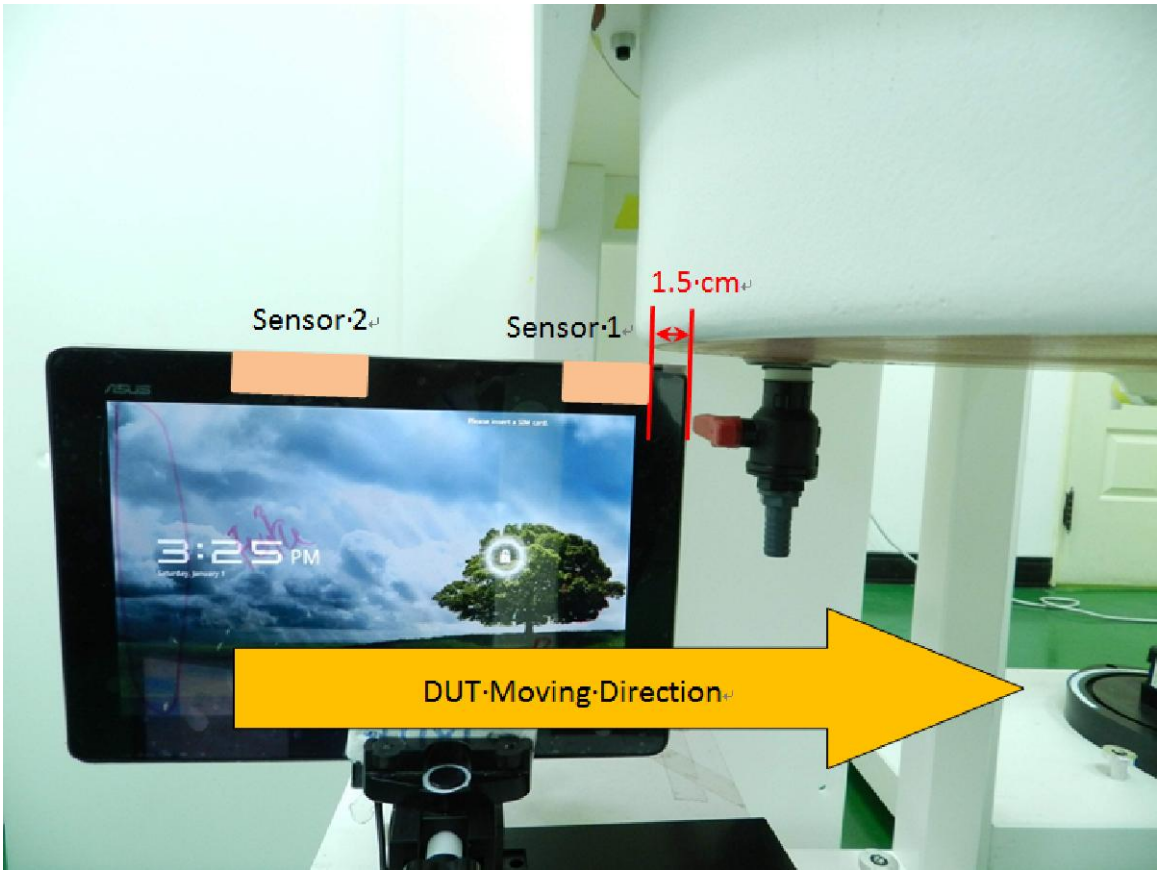


Figure: Secondary Landscape distance to edge (First time triggering)

< **Sensing Coverage Area – Secondary Landscape** >

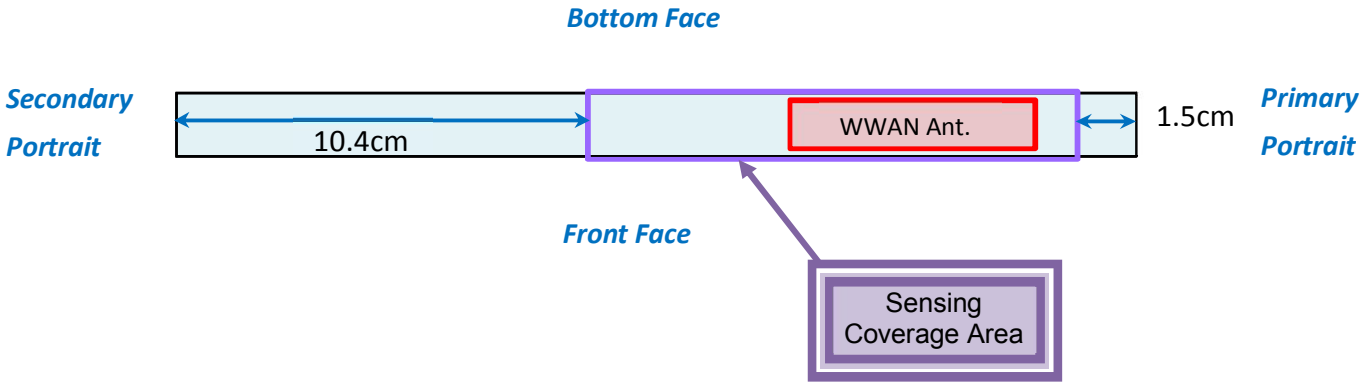


Figure: Secondary Landscape view of coverage area

3. SAR Test Configuration:

3.1 Conducted Power (Unit: dBm)

<GPRS / EDGE without Power Reduction>

Burst Average Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	32.90	32.75	32.70	29.58	29.63	30.03
GPRS 10 (2 Uplink) CS1	32.74	32.63	32.61	29.40	29.45	29.89
GPRS 11 (3 Uplink) CS1	32.60	32.46	32.42	29.25	29.23	29.59
GPRS 12 (4 Uplink) CS1	32.42	32.32	32.29	28.93	28.94	29.40
EDGE 8 (GMSK, 1 Uplink) MCS1	32.78	32.65	32.60	29.54	29.60	29.99
EDGE 10 (GMSK, 2 Uplink) MCS1	32.65	32.53	32.52	29.35	29.42	29.85
EDGE 11 (GMSK, 3 Uplink) MCS1	32.52	32.38	32.32	29.21	29.13	29.53
EDGE 12 (GMSK, 4 Uplink) MCS1	32.35	32.23	32.22	28.88	28.88	29.34
EDGE 8 (8PSK, 1 Uplink) MCS9	26.17	26.26	26.27	26.29	26.35	26.62
EDGE 10 (8PSK, 2 Uplink) MCS9	26.15	26.20	26.19	26.12	26.17	26.46
EDGE 11 (8PSK, 3 Uplink) MCS9	26.00	26.06	26.07	25.95	25.96	26.19
EDGE 12 (8PSK, 4 Uplink) MCS9	25.89	25.91	25.89	25.68	25.71	25.99

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	23.90	23.75	23.70	20.58	20.63	21.03
GPRS 10 (2 Uplink) CS1	26.74	26.63	26.61	23.40	23.45	23.89
GPRS 11 (3 Uplink) CS1	28.34	28.20	28.16	24.99	24.97	25.33
GPRS 12 (4 Uplink) CS1	**29.42**	29.32	29.29	25.93	25.94	**26.40**
EDGE 8 (GMSK, 1 Uplink) MCS1	23.78	23.65	23.60	20.54	20.60	20.99
EDGE 10 (GMSK, 2 Uplink) MCS1	26.65	26.53	26.52	23.35	23.42	23.85
EDGE 11 (GMSK, 3 Uplink) MCS1	28.26	28.12	28.06	24.95	24.87	25.27
EDGE 12 (GMSK, 4 Uplink) MCS1	29.35	29.23	29.22	25.88	25.88	26.34
EDGE 8 (8PSK, 1 Uplink) MCS9	17.17	17.26	17.27	17.29	17.35	17.62
EDGE 10 (8PSK, 2 Uplink) MCS9	20.15	20.20	20.19	20.12	20.17	20.46
EDGE 11 (8PSK, 3 Uplink) MCS9	21.74	21.80	21.81	21.69	21.70	21.93
EDGE 12 (8PSK, 4 Uplink) MCS9	22.89	22.91	22.89	22.68	22.71	22.99

Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT was set in GPRS 12 for GSM850 and set in GPRS 12 for GSM1900 due to its highest source-based time-average power.
2. Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.
3. EDGE tests with MCS1 setting, GMSK modulation. Burst average power with MCS9 setting 8 PSK modulation, is provided voluntary for reference.

<GPRS / EDGE with Power Reduction>

Burst Average Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	26.71	**26.87**	26.71	21.75	21.95	**22.01**
GPRS 10 (2 Uplink) CS1	26.56	26.78	26.61	21.50	21.73	21.81
GPRS 11 (3 Uplink) CS1	26.48	26.69	26.49	21.34	21.49	21.66
GPRS 12 (4 Uplink) CS1	26.31	26.39	26.32	20.95	20.99	21.53
EDGE 8 (GMSK, 1 Uplink) MCS1	26.59	26.82	26.65	21.58	21.79	21.85
EDGE 10 (GMSK, 2 Uplink) MCS1	26.51	26.71	26.56	21.42	21.64	21.71
EDGE 11 (GMSK, 3 Uplink) MCS1	26.39	26.60	26.38	21.25	21.43	21.44
EDGE 12 (GMSK, 4 Uplink) MCS1	26.23	26.45	26.22	20.96	21.16	21.20
EDGE 8 (8PSK, 1 Uplink) MCS9	20.24	20.36	20.14	18.38	18.46	18.54
EDGE 10 (8PSK, 2 Uplink) MCS9	20.20	20.28	20.09	18.26	18.37	18.49
EDGE 11 (8PSK, 3 Uplink) MCS9	19.94	20.00	19.88	17.79	17.72	18.02
EDGE 12 (8PSK, 4 Uplink) MCS9	19.72	19.75	19.67	17.49	17.69	17.73

<GPRS / EDGE with Power Reduction>

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	17.71	17.87	17.71	12.75	12.95	13.01
GPRS 10 (2 Uplink) CS1	20.56	20.78	20.61	15.50	15.73	15.81
GPRS 11 (3 Uplink) CS1	22.22	22.43	22.23	17.08	17.23	17.40
GPRS 12 (4 Uplink) CS1	23.31	**23.39**	23.32	17.95	17.99	**18.53**
EDGE 8 (GMSK, 1 Uplink) MCS1	17.59	17.82	17.65	12.58	12.79	12.85
EDGE 10 (GMSK, 2 Uplink) MCS1	20.51	20.71	20.56	15.42	15.64	15.71
EDGE 11 (GMSK, 3 Uplink) MCS1	22.13	22.34	22.12	16.99	17.17	17.18
EDGE 12 (GMSK, 4 Uplink) MCS1	23.23	23.45	23.22	17.96	18.16	18.20
EDGE 8 (8PSK, 1 Uplink) MCS9	11.24	11.36	11.14	9.38	9.46	9.54
EDGE 10 (8PSK, 2 Uplink) MCS9	14.20	14.28	14.09	12.26	12.37	12.49
EDGE 11 (8PSK, 3 Uplink) MCS9	15.68	15.74	15.62	13.53	13.46	13.76
EDGE 12 (8PSK, 4 Uplink) MCS9	16.72	16.75	16.67	14.49	14.69	14.73

Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT was set in GPRS 12 for GSM850 and set in GPRS 12 for GSM1900 due to its highest source-based time-average power.
2. Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.
3. EDGE tests with MCS1 setting, GMSK modulation. Burst average power with MCS9 setting 8 PSK modulation, is provided voluntary for reference.

Power Reduction Delta Level – Full power and reduction power level

Band	GSM850				GSM1900			
Channel	128	189	251	Target (dB)	512	661	810	Target (dB)
Frequency (MHz)	824.2	836.4	848.8		1850.2	1880	1909.8	
GPRS 8 (1 Uplink) – CS1	6.19	5.88	5.99	6	7.83	7.68	8.02	8
GPRS 10 (2 Uplink) – CS1	6.18	5.85	6.00	6	7.90	7.72	8.08	8
GPRS 11 (3 Uplink) – CS1	6.12	5.77	5.93	6	7.91	7.74	7.93	8
GPRS 12 (4 Uplink) – CS1	6.11	5.83	5.97	6	7.98	7.95	7.87	8
EDGE 8 (1 Uplink) – MCS1	6.19	5.83	5.95	6	7.96	7.81	8.14	8
EDGE 10 (2 Uplink) – MCS1	6.14	5.82	5.96	6	7.93	7.78	8.14	8
EDGE 11 (3 Uplink) – MCS1	6.13	5.78	5.94	6	7.96	7.70	8.09	8
EDGE 12 (4 Uplink) – MCS1	6.12	5.78	6.00	6	7.92	7.72	8.14	8
EDGE 8 (1 Uplink) – MCS9	5.93	5.90	6.13	6	7.91	7.89	8.08	8
EDGE 10 (2 Uplink) – MCS9	5.95	5.92	6.10	6	7.86	7.80	7.97	8
EDGE 11 (3 Uplink) – MCS9	6.06	6.06	6.19	6	8.16	8.24	8.17	8
EDGE 12 (4 Uplink) – MCS9	6.17	6.16	6.22	6	8.19	8.02	8.26	8

Note:

1. Burst average output power here.
2. The target power reduction value is listed in sec. 3.4.2. The deviation from the specification is due to the tolerance in the measurement.

<WCDMA without Power Reduction>

Band		WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel		4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6
RMC 12.2K		24.35	24.14	24.18	24.15	24.23	24.19	23.06	23.22	23.26
HSDPA Subtest-1		24.28	24.03	24.00	24.17	24.16	24.09	22.99	23.17	23.05
HSDPA Subtest-2		23.82	23.48	23.55	23.72	23.85	23.71	22.57	22.87	22.67
HSDPA Subtest-3		23.92	23.55	23.60	23.68	23.90	23.66	22.59	22.69	22.66
HSDPA Subtest-4		23.91	23.56	23.67	23.70	23.70	23.82	22.50	22.79	22.69
HSUPA Subtest-1		23.31	23.01	23.36	23.61	23.45	23.74	22.54	22.63	22.24
HSUPA Subtest-2		22.45	22.67	22.47	22.48	22.46	22.74	21.82	21.62	21.45
HSUPA Subtest-3		22.63	22.31	22.48	22.72	22.82	22.94	21.61	21.96	21.83
HSUPA Subtest-4		22.56	22.93	22.63	22.88	22.80	22.94	21.66	21.83	21.72
HSUPA Subtest-5		23.84	23.44	23.65	23.80	23.90	23.85	22.31	22.35	22.40
MPR										
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.46	0.55	0.45	0.45	0.31	0.38	0.42	0.30	0.38
0.5	HSDPA Subtest-3	0.36	0.48	0.40	0.49	0.26	0.43	0.40	0.48	0.39
0.5	HSDPA Subtest-4	0.37	0.47	0.33	0.47	0.46	0.27	0.49	0.38	0.36
0	HSUPA Subtest-1	0.53	0.43	0.29	0.19	0.45	0.11	-0.23	-0.28	0.16
1	HSUPA Subtest-2	1.39	0.77	1.18	1.32	1.44	1.11	0.49	0.73	0.95
1	HSUPA Subtest-3	1.21	1.13	1.17	1.08	1.08	0.91	0.70	0.39	0.57
1	HSUPA Subtest-4	1.28	0.51	1.02	0.92	1.10	0.91	0.65	0.52	0.68
0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

<WCDMA with Power Reduction>

Band		WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel		4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6
RMC 12.2K		20.27	19.81	20.15	17.70	17.72	17.79	17.76	18.18	17.66
HSDPA Subtest-1		20.18	19.80	20.04	17.89	17.95	17.87	17.40	17.87	17.27
HSDPA Subtest-2		19.70	19.31	19.56	17.91	18.00	17.93	17.51	17.92	17.40
HSDPA Subtest-3		19.75	19.34	19.66	17.53	17.63	17.64	17.25	17.71	17.15
HSDPA Subtest-4		19.81	19.45	19.68	17.65	17.73	17.70	17.30	17.81	17.11
HSUPA Subtest-1		19.53	19.11	19.42	17.52	17.41	17.46	17.33	17.53	17.20
HSUPA Subtest-2		18.70	18.37	18.66	16.08	16.20	16.31	16.61	16.48	16.54
HSUPA Subtest-3		18.94	18.58	18.89	16.63	16.48	16.70	16.88	16.96	16.99
HSUPA Subtest-4		18.94	18.57	18.91	16.22	16.35	16.42	16.57	16.78	16.40
HSUPA Subtest-5		19.73	20.01	20.20	17.42	17.84	17.75	17.17	17.20	17.00
MPR										
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.48	0.49	0.48	-0.02	-0.05	-0.06	-0.11	-0.05	-0.13	-0.13
0.5	0.43	0.46	0.38	0.36	0.32	0.23	0.15	0.16	0.12	0.12
0.5	0.37	0.35	0.36	0.24	0.22	0.17	0.10	0.06	0.16	0.16
0	0.20	0.90	0.78	-0.10	0.43	0.29	-0.16	-0.33	-0.20	-0.20
1	1.03	1.64	1.54	1.34	1.64	1.44	0.56	0.72	0.46	0.46
1	0.79	1.43	1.31	0.79	1.36	1.05	0.29	0.24	0.01	0.01
1	0.79	1.44	1.29	1.20	1.49	1.33	0.60	0.42	0.60	0.60
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note:

1. For Body SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA subset-1 and HSUPA subset-5 output power is < 1/4 dB higher than RMC, or SAR with RMC 12.2kbps setting is ≦1.2W/kg, HSDPA and HSUPA SAR evaluation can be excluded.
2. According to KDB 941225 D02 v02, 1)b), the MPR implementation information is provided here.

Power Reduction Delta Level – Full power and reduction power level

Band	WCDMA Band V				WCDMA Band II				WCDMA Band IV			
Channel	4132	4182	4233	Target Reduction (dB)	9262	9400	9538	Target Reduction (dB)	1312	1413	1513	Target Reduction (dB)
Frequency (MHz)	826.4	836.4	846.6		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
RMC 12.2K	4.08	4.33	4.03	4	6.45	6.51	6.40	6.5	5.30	5.04	5.60	5
HSDPA Subtest-1	4.10	4.23	3.96	4	6.28	6.21	6.22	6.5	5.59	5.30	5.78	5
HSDPA Subtest-2	4.12	4.17	3.99	4	5.81	5.85	5.78	6.5	5.06	4.95	5.27	5
HSDPA Subtest-3	4.17	4.21	3.94	4	6.15	6.27	6.02	6.5	5.34	4.98	5.51	5
HSDPA Subtest-4	4.10	4.11	3.99	4	6.05	5.97	6.12	6.5	5.20	4.98	5.58	5
HSUPA Subtest-1	3.78	3.90	3.94	4	6.09	6.04	6.28	6.5	5.21	5.10	5.04	5
HSUPA Subtest-2	3.75	4.30	3.81	4	6.40	6.26	6.43	6.5	5.21	5.14	4.91	5
HSUPA Subtest-3	3.69	3.73	3.59	4	6.09	6.34	6.24	6.5	4.73	5.00	4.84	5
HSUPA Subtest-4	3.62	4.36	3.72	4	6.66	6.45	6.52	6.5	5.09	5.05	5.32	5
HSUPA Subtest-5	4.11	3.43	3.45	4	6.38	6.06	6.10	6.5	5.14	5.15	5.40	5

<Without Power Reduction: LTE band 17>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)
709	23780	10	1	0	QPSK	**23.55**	0	0.00
709	23780	10	1	49	QPSK	23.49	0	0.06
709	23780	10	25	13	QPSK	23.23	≤ 1	0.32
709	23780	10	50	0	QPSK	23.11	≤ 1	0.44
709	23780	10	1	0	16-QAM	22.73	≤ 1	0.82
709	23780	10	1	49	16-QAM	23.09	≤ 1	0.46
709	23780	10	25	13	16-QAM	22.29	≤ 2	1.26
709	23780	10	50	0	16-QAM	22.23	≤ 2	1.32
706.5	23755	5	1	0	QPSK	23.50	0	0.00
706.5	23755	5	1	24	QPSK	23.48	0	0.02
706.5	23755	5	12	6	QPSK	23.06	≤ 1	0.44
706.5	23755	5	25	0	QPSK	23.48	≤ 1	0.02
706.5	23755	5	1	0	16-QAM	22.91	≤ 1	0.59
706.5	23755	5	1	24	16-QAM	22.71	≤ 1	0.79
706.5	23755	5	12	6	16-QAM	22.31	≤ 2	1.19
706.5	23755	5	25	0	16-QAM	22.96	≤ 2	0.54
710	23790	10	1	0	QPSK	23.50	0	0.00
710	23790	10	1	49	QPSK	23.43	0	0.07
710	23790	10	25	13	QPSK	23.13	≤ 1	0.37
710	23790	10	50	0	QPSK	22.89	≤ 1	0.61
710	23790	10	1	0	16-QAM	22.68	≤ 1	0.82
710	23790	10	1	49	16-QAM	22.96	≤ 1	0.54
710	23790	10	25	13	16-QAM	22.37	≤ 2	1.13
710	23790	10	50	0	16-QAM	22.06	≤ 2	1.44
710	23790	5	1	0	QPSK	23.45	0	0.00
710	23790	5	1	24	QPSK	23.38	0	0.07
710	23790	5	12	6	QPSK	23.10	≤ 1	0.35
710	23790	5	25	0	QPSK	23.24	≤ 1	0.21
710	23790	5	1	0	16-QAM	22.96	≤ 1	0.49
710	23790	5	1	24	16-QAM	22.87	≤ 1	0.58
710	23790	5	12	6	16-QAM	22.56	≤ 2	0.89
710	23790	5	25	0	16-QAM	22.66	≤ 2	0.79
711	23800	10	1	0	QPSK	23.51	0	0.00
711	23800	10	1	49	QPSK	23.46	0	0.05
711	23800	10	25	13	QPSK	23.22	≤ 1	0.29
711	23800	10	50	0	QPSK	23.09	≤ 1	0.42
711	23800	10	1	0	16-QAM	22.70	≤ 1	0.81
711	23800	10	1	49	16-QAM	22.96	≤ 1	0.55
711	23800	10	25	13	16-QAM	22.33	≤ 2	1.18
711	23800	10	50	0	16-QAM	22.47	≤ 2	1.04
713.5	23825	5	1	0	QPSK	23.46	0	0.00
713.5	23825	5	1	24	QPSK	23.33	0	0.13
713.5	23825	5	12	6	QPSK	23.12	≤ 1	0.34
713.5	23825	5	25	0	QPSK	23.34	≤ 1	0.12
713.5	23825	5	1	0	16-QAM	22.67	≤ 1	0.79
713.5	23825	5	1	24	16-QAM	22.83	≤ 1	0.63
713.5	23825	5	12	6	16-QAM	22.30	≤ 2	1.16
713.5	23825	5	25	0	16-QAM	22.92	≤ 2	0.54

<With Power Reduction: LTE band 17>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)	Power Reduction (dB)
709	23780	10	1	0	QPSK	20.55	0	0.00	3.00
709	23780	10	1	49	QPSK	20.46	0	0.09	3.03
709	23780	10	25	13	QPSK	20.41	≤ 1	0.14	2.82
709	23780	10	50	0	QPSK	20.26	≤ 1	0.29	2.85
709	23780	10	1	0	16-QAM	19.83	≤ 1	0.72	2.90
709	23780	10	1	49	16-QAM	19.77	≤ 1	0.78	3.32
709	23780	10	25	13	16-QAM	19.19	≤ 2	1.36	3.10
709	23780	10	50	0	16-QAM	19.10	≤ 2	1.45	3.13
706.5	23755	5	1	0	QPSK	20.48	0	0.00	3.02
706.5	23755	5	1	24	QPSK	20.29	0	0.19	3.19
706.5	23755	5	12	6	QPSK	20.30	≤ 1	0.18	2.76
706.5	23755	5	25	0	QPSK	20.33	≤ 1	0.15	3.15
706.5	23755	5	1	0	16-QAM	20.12	≤ 1	0.36	2.79
706.5	23755	5	1	24	16-QAM	19.68	≤ 1	0.80	3.03
706.5	23755	5	12	6	16-QAM	19.44	≤ 2	1.04	2.87
706.5	23755	5	25	0	16-QAM	19.81	≤ 2	0.67	3.15
710	23790	10	1	0	QPSK	20.59	0	0.00	2.91
710	23790	10	1	49	QPSK	20.39	0	0.20	3.04
710	23790	10	25	13	QPSK	19.97	≤ 1	0.62	3.16
710	23790	10	50	0	QPSK	20.05	≤ 1	0.54	2.84
710	23790	10	1	0	16-QAM	19.78	≤ 1	0.81	2.90
710	23790	10	1	49	16-QAM	20.19	≤ 1	0.40	2.77
710	23790	10	25	13	16-QAM	19.43	≤ 2	1.16	2.94
710	23790	10	50	0	16-QAM	18.96	≤ 2	1.63	3.10
710	23790	5	1	0	QPSK	20.40	0	0.00	3.05
710	23790	5	1	24	QPSK	20.31	0	0.09	3.07
710	23790	5	12	6	QPSK	20.18	≤ 1	0.22	2.92
710	23790	5	25	0	QPSK	20.19	≤ 1	0.21	3.05
710	23790	5	1	0	16-QAM	20.23	≤ 1	0.17	2.73
710	23790	5	1	24	16-QAM	20.00	≤ 1	0.40	2.87
710	23790	5	12	6	16-QAM	19.64	≤ 2	0.76	2.92
710	23790	5	25	0	16-QAM	19.59	≤ 2	0.81	3.07
711	23800	10	1	0	QPSK	**20.69**	0	0.00	2.82
711	23800	10	1	49	QPSK	20.37	0	0.32	3.09
711	23800	10	25	13	QPSK	20.06	≤ 1	0.63	3.16
711	23800	10	50	0	QPSK	20.36	≤ 1	0.33	2.73
711	23800	10	1	0	16-QAM	19.84	≤ 1	0.85	2.86
711	23800	10	1	49	16-QAM	19.78	≤ 1	0.91	3.18
711	23800	10	25	13	16-QAM	19.36	≤ 2	1.33	2.97
711	23800	10	50	0	16-QAM	19.29	≤ 2	1.40	3.18
713.5	23825	5	1	0	QPSK	20.40	0	0.00	3.06
713.5	23825	5	1	24	QPSK	20.16	0	0.24	3.17
713.5	23825	5	12	6	QPSK	20.12	≤ 1	0.28	3.00
713.5	23825	5	25	0	QPSK	19.96	≤ 1	0.44	3.38
713.5	23825	5	1	0	16-QAM	19.93	≤ 1	0.47	2.74
713.5	23825	5	1	24	16-QAM	19.92	≤ 1	0.48	2.91
713.5	23825	5	12	6	16-QAM	19.33	≤ 2	1.07	2.97
713.5	23825	5	25	0	16-QAM	19.80	≤ 2	0.60	3.12

<Without Power Reduction: LTE band 4>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)
1715	20000	10	1	0	QPSK	23.20	0	0.00
1715	20000	10	1	49	QPSK	23.11	0	0.09
1715	20000	10	25	13	QPSK	22.87	≤ 1	0.33
1715	20000	10	50	0	QPSK	22.69	≤ 1	0.51
1715	20000	10	1	0	16-QAM	22.18	≤ 1	1.02
1715	20000	10	1	49	16-QAM	22.01	≤ 1	1.19
1715	20000	10	25	13	16-QAM	21.86	≤ 2	1.34
1715	20000	10	50	0	16-QAM	21.92	≤ 2	1.28
1712.5	19975	5	1	0	QPSK	23.16	0	0.00
1712.5	19975	5	1	24	QPSK	23.03	0	0.13
1712.5	19975	5	12	6	QPSK	22.84	≤ 1	0.32
1712.5	19975	5	25	0	QPSK	22.76	≤ 1	0.40
1712.5	19975	5	1	0	16-QAM	22.11	≤ 1	1.05
1712.5	19975	5	1	24	16-QAM	22.32	≤ 1	0.84
1712.5	19975	5	12	6	16-QAM	21.79	≤ 2	1.37
1712.5	19975	5	25	0	16-QAM	21.83	≤ 2	1.33
1732.5	20175	10	1	0	QPSK	**23.23**	0	0.00
1732.5	20175	10	1	49	QPSK	23.16	0	0.07
1732.5	20175	10	25	13	QPSK	22.94	≤ 1	0.29
1732.5	20175	10	50	0	QPSK	22.86	≤ 1	0.37
1732.5	20175	10	1	0	16-QAM	22.26	≤ 1	0.97
1732.5	20175	10	1	49	16-QAM	22.30	≤ 1	0.93
1732.5	20175	10	25	13	16-QAM	21.77	≤ 2	1.46
1732.5	20175	10	50	0	16-QAM	21.82	≤ 2	1.41
1732.5	20175	5	1	0	QPSK	23.17	0	0.00
1732.5	20175	5	1	24	QPSK	23.09	0	0.08
1732.5	20175	5	12	6	QPSK	22.97	≤ 1	0.20
1732.5	20175	5	25	0	QPSK	22.77	≤ 1	0.40
1732.5	20175	5	1	0	16-QAM	22.38	≤ 1	0.79
1732.5	20175	5	1	24	16-QAM	22.40	≤ 1	0.77
1732.5	20175	5	12	6	16-QAM	21.87	≤ 2	1.30
1732.5	20175	5	25	0	16-QAM	21.67	≤ 2	1.50
1750	20350	10	1	0	QPSK	23.19	0	0.00
1750	20350	10	1	49	QPSK	23.12	0	0.07
1750	20350	10	25	13	QPSK	23.06	≤ 1	0.13
1750	20350	10	50	0	QPSK	22.88	≤ 1	0.31
1750	20350	10	1	0	16-QAM	22.40	≤ 1	0.79
1750	20350	10	1	49	16-QAM	22.34	≤ 1	0.85
1750	20350	10	25	13	16-QAM	21.86	≤ 2	1.33
1750	20350	10	50	0	16-QAM	21.92	≤ 2	1.27
1752.5	20375	5	1	0	QPSK	23.15	0	0.00
1752.5	20375	5	1	24	QPSK	23.07	0	0.08
1752.5	20375	5	12	6	QPSK	22.99	≤ 1	0.16
1752.5	20375	5	25	0	QPSK	22.74	≤ 1	0.41
1752.5	20375	5	1	0	16-QAM	22.40	≤ 1	0.75
1752.5	20375	5	1	24	16-QAM	22.37	≤ 1	0.78
1752.5	20375	5	12	6	16-QAM	21.76	≤ 2	1.39
1752.5	20375	5	25	0	16-QAM	21.69	≤ 2	1.46

<With Power Reduction: LTE band 4>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)	Power Reduction (dB)
1715	20000	10	1	0	QPSK	19.35	0	0.00	3.85
1715	20000	10	1	49	QPSK	19.26	0	0.09	3.85
1715	20000	10	25	13	QPSK	19.12	≤ 1	0.23	3.75
1715	20000	10	50	0	QPSK	18.68	≤ 1	0.67	4.01
1715	20000	10	1	0	16-QAM	18.80	≤ 1	0.55	3.38
1715	20000	10	1	49	16-QAM	18.17	≤ 1	1.18	3.84
1715	20000	10	25	13	16-QAM	17.87	≤ 2	1.48	3.99
1715	20000	10	50	0	16-QAM	17.54	≤ 2	1.81	4.38
1712.5	19975	5	1	0	QPSK	19.23	0	0.00	3.93
1712.5	19975	5	1	24	QPSK	19.19	0	0.04	3.84
1712.5	19975	5	12	6	QPSK	18.59	≤ 1	0.64	4.25
1712.5	19975	5	25	0	QPSK	18.42	≤ 1	0.81	4.34
1712.5	19975	5	1	0	16-QAM	18.25	≤ 1	0.98	3.86
1712.5	19975	5	1	24	16-QAM	18.64	≤ 1	0.59	3.68
1712.5	19975	5	12	6	16-QAM	17.37	≤ 2	1.86	4.42
1712.5	19975	5	25	0	16-QAM	17.27	≤ 2	1.96	4.56
1732.5	20175	10	1	0	QPSK	19.34	0	0.00	3.89
1732.5	20175	10	1	49	QPSK	19.24	0	0.10	3.92
1732.5	20175	10	25	13	QPSK	18.75	≤ 1	0.59	4.19
1732.5	20175	10	50	0	QPSK	18.63	≤ 1	0.71	4.23
1732.5	20175	10	1	0	16-QAM	18.79	≤ 1	0.55	3.47
1732.5	20175	10	1	49	16-QAM	18.90	≤ 1	0.44	3.40
1732.5	20175	10	25	13	16-QAM	17.68	≤ 2	1.66	4.09
1732.5	20175	10	50	0	16-QAM	17.55	≤ 2	1.79	4.27
1732.5	20175	5	1	0	QPSK	18.97	0	0.20	4.20
1732.5	20175	5	1	24	QPSK	19.17	0	0.00	3.92
1732.5	20175	5	12	6	QPSK	18.52	≤ 1	0.65	4.45
1732.5	20175	5	25	0	QPSK	18.44	≤ 1	0.73	4.33
1732.5	20175	5	1	0	16-QAM	18.38	≤ 1	0.79	4.00
1732.5	20175	5	1	24	16-QAM	18.61	≤ 1	0.56	3.79
1732.5	20175	5	12	6	16-QAM	17.32	≤ 2	1.85	4.55
1732.5	20175	5	25	0	16-QAM	17.17	≤ 2	2.00	4.50
1750	20350	10	1	0	QPSK	19.26	0	0.00	3.93
1750	20350	10	1	49	QPSK	19.17	0	0.09	3.95
1750	20350	10	25	13	QPSK	19.12	≤ 1	0.14	3.94
1750	20350	10	50	0	QPSK	19.06	≤ 1	0.20	3.82
1750	20350	10	1	0	16-QAM	18.83	≤ 1	0.43	3.57
1750	20350	10	1	49	16-QAM	18.35	≤ 1	0.91	3.99
1750	20350	10	25	13	16-QAM	18.03	≤ 2	1.23	3.83
1750	20350	10	50	0	16-QAM	17.97	≤ 2	1.29	3.95
1752.5	20375	5	1	0	QPSK	19.14	0	0.00	4.01
1752.5	20375	5	1	24	QPSK	19.10	0	0.04	3.97
1752.5	20375	5	12	6	QPSK	18.81	≤ 1	0.33	4.18
1752.5	20375	5	25	0	QPSK	18.66	≤ 1	0.48	4.08
1752.5	20375	5	1	0	16-QAM	18.55	≤ 1	0.59	3.85
1752.5	20375	5	1	24	16-QAM	18.94	≤ 1	0.20	3.43
1752.5	20375	5	12	6	16-QAM	17.67	≤ 2	1.47	4.09
1752.5	20375	5	25	0	16-QAM	17.58	≤ 2	1.56	4.11

Note:

1. Per KDB 941225, if the output power variation across the band < 0.5dB, test middle channel SAR first and determine further test reduction based on the SAR results.
2. During proximity sensor activated and power reduction enabled, the LTE output is reduced to certain level, while MPR for different RB configurations is disabled. The power reduction is based on the normal maximum output power.

LTE Target MPR level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

For Band 17 <Maximum Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	0.5	1	≤ 2

For Band 17 <Reduction Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0	0.5	≤ 1
16 QAM	> 8	> 12	0.5	1	≤ 2

For Band 4 <Maximum Power>:

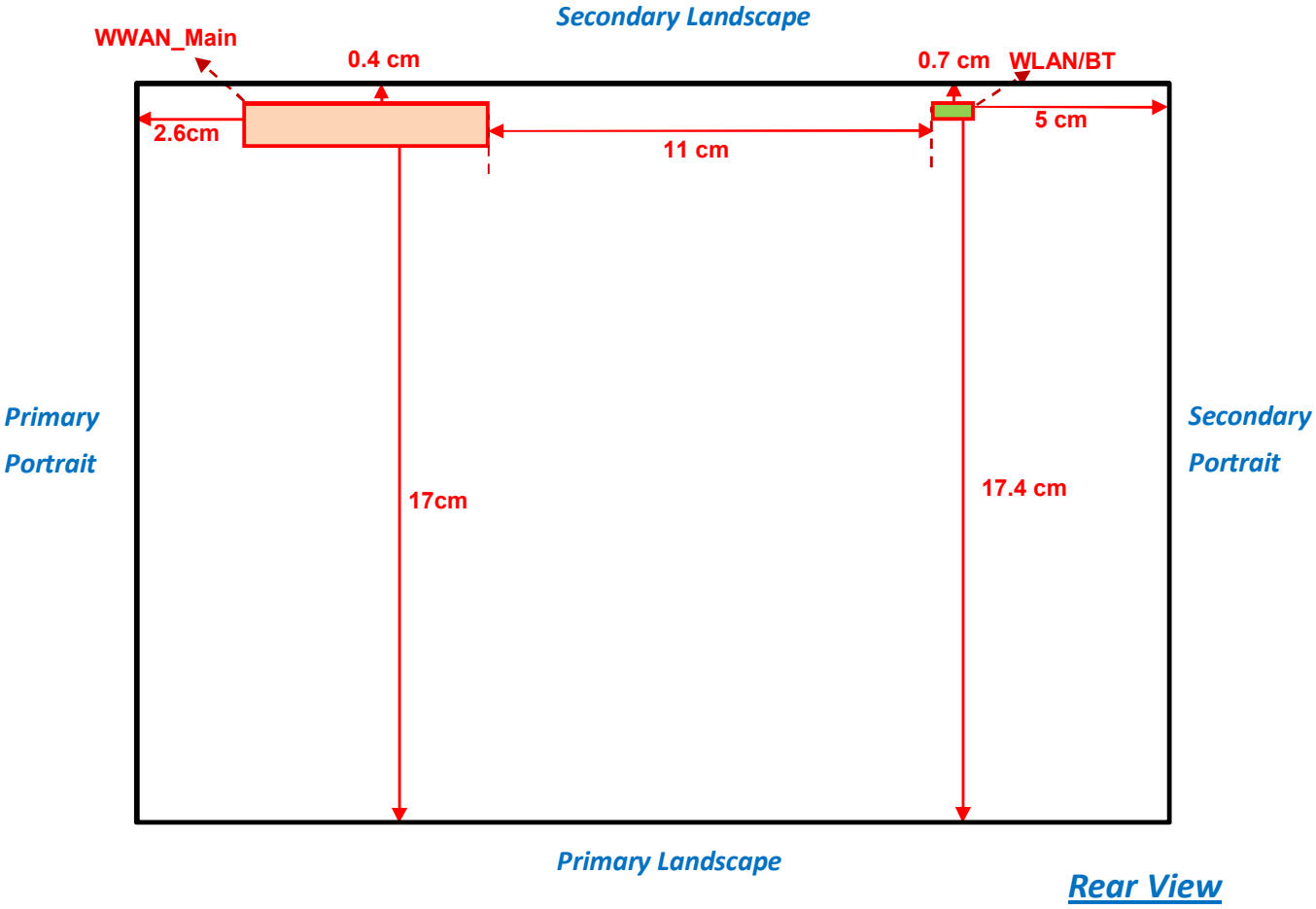
Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.8	0.8	≤ 1
16 QAM	> 8	> 12	1.3	1.3	≤ 2

For Band 4 <Reduction Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0.5	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	1.5	1.4	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected 0.7dB measurement tolerance

3.2 Antenna location—Rear view



WWAN Antenna <Tx / Rx>	GSM850 GSM1900 WCDMA Band 2 WCDMA Band 4 WCDMA Band 5 LTE Band 4 LTE Band 17
WLAN/BT antenna <Tx / Rx>	2.4GHz 802.11 b/g/n Bluetooth

3.3 Standalone SAR

Sides for SAR tests; Tablet (> 20cm diagonal)						
	Bottom Face	**Front Face**	**Secondary Landscape**	**Primary Landscape**	**Secondary Portrait**	**Primary Portrait**
GPRS/EDGE	✓ (0, 10mm)	x	✓ (0, 11mm)	x	x	✓ (0 mm)
UMTS	✓ (0, 10mm)	x	✓ (0, 11mm)	x	x	✓ (0 mm)
LTE	✓ (0, 10mm)	x	✓ (0, 11mm)	x	X	✓ (0 mm)
WLAN	✓ (0 mm)	x	✓ (0 mm)	x	✓ (0 mm)	x

Note:

1. Per KDB 941225 D07, the EUT diagonal > 20 cm and Mini-Tablet procedure is not applied. Therefore, SAR tests follow the Tablet Mode in KDB 447498.
2. There is no screen orientation limitation in EUT; that is 4 orientations are supported.
3. As in (1), the test distance is 0 mm to the flat phantom; SAR evaluation is required for Bottom Face and each applicable Edge with the antenna within 5 cm to the user.
4. The test distance 10 mm at Bottom Face and 11mm at Secondary Landscape are for verifying the conservative condition, whichever EUT proximity sensor maximum activated distance is 11 mm at Bottom Face and 12 mm at Secondary Landscape. The EUT is set in full-power mode at 10 mm and 11mm test distance to the phantom.
5. The proximity sensor is designed to be triggered for Bottom Face and Secondary-Landscape exposure positions. During SAR tests for EUT other edges, the sensor is disabled via software setting.
6. EUT does not support voice call function; therefore GSM SAR is not required.
7. Per KDB 447498 D01, the distance from WWAN Main antenna to the Secondary Portrait / Primary Landscape edge > 5 cm, therefore the stand-alone in these configurations SAR are not required.
8. Per KDB 447498 D01, the distance from WLAN antenna to the Primary Portrait / Primary Landscape edge > 5 cm, therefore the stand-alone SAR in these configurations are not required.
9. Per KDB 447498 D01, Bluetooth output power ≤ 60/f, thus standalone SAR is not required.

3.4 Simultaneous SAR Analysis

	Applicable Combination
Simultaneous Transmission	GPRS/EDGE + WLAN
	UMTS + WLAN
	LTE + WLAN
	WLAN + BT
	GPRS/EDGE + BT
	LTE + BT

Simultaneous Transmission SAR						
Exposure Position	**Bottom Face**	**Front Face**	**Secondary Landscape**	**Primary Landscape**	**Primary Portrait**	**Secondary Portrait**
WWAN With power reduction enable by P-sensor	0mm	x	0mm	x	x	x
WLAN 2.4GHz	0mm	x	0mm	x	x	x
WWAN With Full Power	10mm	x	x	x	x	x
WLAN 2.4GHz	0mm	x	x	x	x	x
WWAN With Full Power	x	x	11mm	x	x	x
WLAN 2.4GHz	x	x	0mm	x	x	X

Note:

1. For simultaneous SAR evaluation (WWAN Ant. + WLAN Ant.) at Bottom Face, 10mm distance, since WLAN SAR value 0mm will be worse than 10mm data; therefore 0mm WLAN SAR data is used here.
2. For simultaneous SAR evaluation (WWAN Ant. + WLAN Ant.) at Secondary Landscape, 11mm distance, since WLAN SAR value 0mm will be worse than 11mm data; therefore 0mm WLAN SAR data is used here.
3. EUT will choose either LTE or GPRS/EDGE/UMTS according to the network signal condition, LTE network is with higher priority for data connection; therefore, LTE transmission will not exist with GPRS/EDGE or UMTS at the same time.
4. Per KDB 447498 D01, Bluetooth output power ≤ 60/f (GHz) mW, which stand-alone SAR evaluation is not required, and is considered zero in the 1-g SAR summation.
5. When standalone 1-g SAR is not required for a transmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirement.