EMTEK
Access to the World

SAR TEST REPORT

For

Rugged Tablet

Model No.: xTablet T8650

FCC ID: O86T8650

Trademark: MobileDemand

REPORT NO.: ES160623027E9

ISSUE DATE: July 30, 2016

Prepared for

MobileDemand, L.C.
1501 Boyson Sq Dr, Ste 101 Hiawatha, Iowa, United States 52233

Prepared by

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1 TEST RESULT CERTIFICATION

Applicant:	MobileDemand, L.C. 1501 Boyson Sq Dr, Ste 101 Hiawatha, Iowa, United States 52233
Manufacturer:	MSI ELECTRONICS (KUNSHAN) CO LTD. No. 88 E QUANJIN RD KUNSHAN JIANGSU, CHINA
Product Description:	Rugged Tablet
Model Number:	xTablet T8650
File Number:	ES160623027E9
Date of Test:	June 24, 2016 to July 30, 2016

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013	PASS

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in IEEE 1528-2013.This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

The test results of this report relate only to the tested sample identified in this report.

Date of Test : June 24, 2016 to July 30, 2016

Prepared by : Hopping Chen/Editor

Reviewer : Joe Xia/Supervisor

Approve & Authorized Signer : Lisa Wang/Manager

2 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Device Type:	Portable Device
Exposure Category:	Uncontrolled Environment/General Population
Data Rate	WIFI2.4G: 802.11b:1,2,5.5,11Mbps; 802.11g:6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS7; WIFI5G: 802.11a:6, 9, 12, 18, 24, 36, 48, 54Mbps; 802.11n(HT20): MCS0-MCS7; 802.11n(HT40): MCS0-MCS7; 802.11ac(HT20): MCS0-MCS7; 802.11ac(HT40):MCS0-MCS9; 802.11ac(VHT80):MCS0-MCS9; Bluetooth: 1Mbps for GFSK modulation 2Mbps for pi/4-DQPSK modulation 3Mbps for 8DPSK modulation
Modulation:	WIFI: DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/g/n; OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11ac; Bluetooth: GFSK, pi/4-DQPSK, 8DPSK for Bluetooth DSS; GFSK for Bluetooth DTS; GSM: GMSK for GPRS/EDGE, GMSK /8PSK for EGPRS WCDMA: QPSK/BPSK for WCDMA/HSUPA/HSDPA CDMA: O-QPSK, H-PSK LTE: QPSK/16QAM for LTE; NFC: ASK
Operating Frequency Range:	WIFI2.4G: 2412-2462MHz for 802.11b/g/n(HT20); WIFI5G: 5180-5240MHz for 802.11a/n(HT20)/ac(VHT20) UNII Band I; 5190-5230MHz for 802.11n(HT40)/ac(VHT40) UNII Band I;

	5210MHz for 802.11 ac(VHT80) UNII Band I; 5745-5825MHz for 802.11a/n(HT20)/ac(VHT20) UNII Band III; 5755-5795MHz for 802.11n(HT40)/ac(VHT40) UNII Band III; 5775MHz for 802.11 ac(VHT80) UNII Band III; Bluetooth: 2402-2480MHz for Bluetooth; GSM: TX 824 to 849MHz /RX 869 to 894MHz for GSM850 TX 1850 to 1910MHz /RX 1930 to 1990MHz for GSM1900 WCDMA: TX 824 to 849MHz /RX 869 to 894MHz for WCDMA850(Band V) TX 1710 to 1755MHz /RX 2110 to 2155MHz for WCDMA1700(Band IV) TX 1850 to 1910MHz /RX 1930 to 1990MHz for WCDMA1900(Band II) CDMA: TX 824 to 849MHz /RX 869 to 894MHz for BC0 TX 1850 to 1910MHz /RX 1930 to 1990MHz for BC1 LTE: TX 1850 to 1910MHz /RX 1930 to 1990MHz for LTE BAND2 TX 1710 to 1755MHz /RX 2110 to 2155MHz for LTE BAND4 TX 824 to 849MHz /RX 869 to 894MHz for LTE BAND5 TX 777 to 787MHz /RX 746 to 756MHz for LTE BAND13 TX 704 to 716MHz /RX 734 to 746MHz for LTE BAND17 TX 1850 to 1915MHz /RX 1930 to 1995MHz for LTE BAND25 NFC: 13.56MHz
Number of Channels:	WIFI2.4G: 11 channels for 802.11b/g n(HT20); WIFI5G: 4 channels for 802.11a/n(HT20)/ac(VHT20) UNII Band I; 2 channels for 802.11n(HT40)/ac(VHT40) UNII Band I; 1 channel for 802.11 ac(VHT80) UNII Band ; 5 channels for 802.11a/n(HT20)/ac(VHT20) UNII Band III; 2 channels for 802.11n(HT40)/ac(VHT40) UNII Band III; 1 channel for 802.11 ac(VHT80) UNII Band III; Bluetooth: 79 channels for Bluetooth DSS; 40 channels for Bluetooth DTS; GSM: 124 Channels for GSM850; 299 Channels for PCS1900; WCDMA: 108 Channels for WCDMA V; 289 Channels for WCDMA II; 211 Channels for WCDMA IV; NFC: 1 channel;

Supported Channel Bandwidth(MHz):	CDMA BC0, BC1: 1.25 LTE Band 2(Bandwidth): 5, 10, 15, 20; LTE Band 4(Bandwidth): 5, 10, 15, 20; LTE Band 5(Bandwidth): 5, 10; LTE Band 13(Bandwidth): 5, 10; LTE Band 17(Bandwidth): 5, 10; LTE Band 25(Bandwidth): 5, 10, 15, 20;
Antenna Type:	FPC Antenna for WIFI, Bluetooth, GSM, WCDMA, CDMA, LTE Induction coil for NFC
Antenna Gain:	Wifi2.4G:3.27 dBi Wifi5G: 2.7dBi for UNII Band I, 5.41dBi for UNII Band III Bluetooth: 3.27dBi GSM850: 2.48dBi; GSM1900: 2.96dBi; WCDMA850: 2.48dBi; WCDMA1900: 2.96dBi; WCDMA1700: 1.93dBi; CDMA BC0: 2.48dBi; CDMA BC1: 2.34dBi; LTE BAND2: 2.34dBi; LTE BAND4: 1.93dBi; LTE BAND5: -3.43dBi; LTE BAND13: -3.14dBi; LTE BAND17: 0dBi; LTE BAND25: 2.23dBi;
Power supply:	☒3.7V internal rechargeable lithium battery ☒DC 19V from adapter
	☒Adapter: Model: A12-065N2A Rev: 02 AC Input: 100-240V~1.7A 50-60Hz DC Output: 19v/3.42A 65W
Temperature Range:	-10°C ~ +50°C

Note:

1. *For more details, please refer to the User's manual of the EUT.*
2. *The sample under test was selected by the Client.*

Modified Information

Rev.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	2016-07-30	ES160623027E9

3 STATEMENT OF COMPLIANCE

Equipment Class	Frequency Band	Operating Mode	Highest SAR Summary		
			Head 1g SAR (W/kg)	Body 1g SAR (W/kg)	Simultaneous Transmission SAR (W/kg)
PCB	GSM850	Data	N/A	1.057	1.531
	GSM1900	Data	N/A	1.181	
	WCDMA V	Data	N/A	1.036	
	WCDMA IV	Data	N/A	1.025	
	WCDMA II	Data	N/A	1.274	
	CDMA BC0	Data	N/A	0.846	
	CDMA BC1	Data	N/A	1.013	
	LTE Band17	Data	N/A	0.742	
	LTE Band13	Data	N/A	0.783	
	LTE Band5	Data	N/A	0.799	
	LTE Band4	Data	N/A	0.705	
	LTE Band2	Data	N/A	1.13	
	LTE Band25	Data	N/A	1.136	
DSS	Bluetooth	Data	N/A	N/A	1.316
DTS	WLAN 2.4GHz	Data	N/A	0.059	1.531
	WLAN 5.8GHz	Data	N/A	0.257	
NII	WLAN 5.2GHz	Data	N/A	0.092	1.366
NOTE: N/A (Not Applicable)					

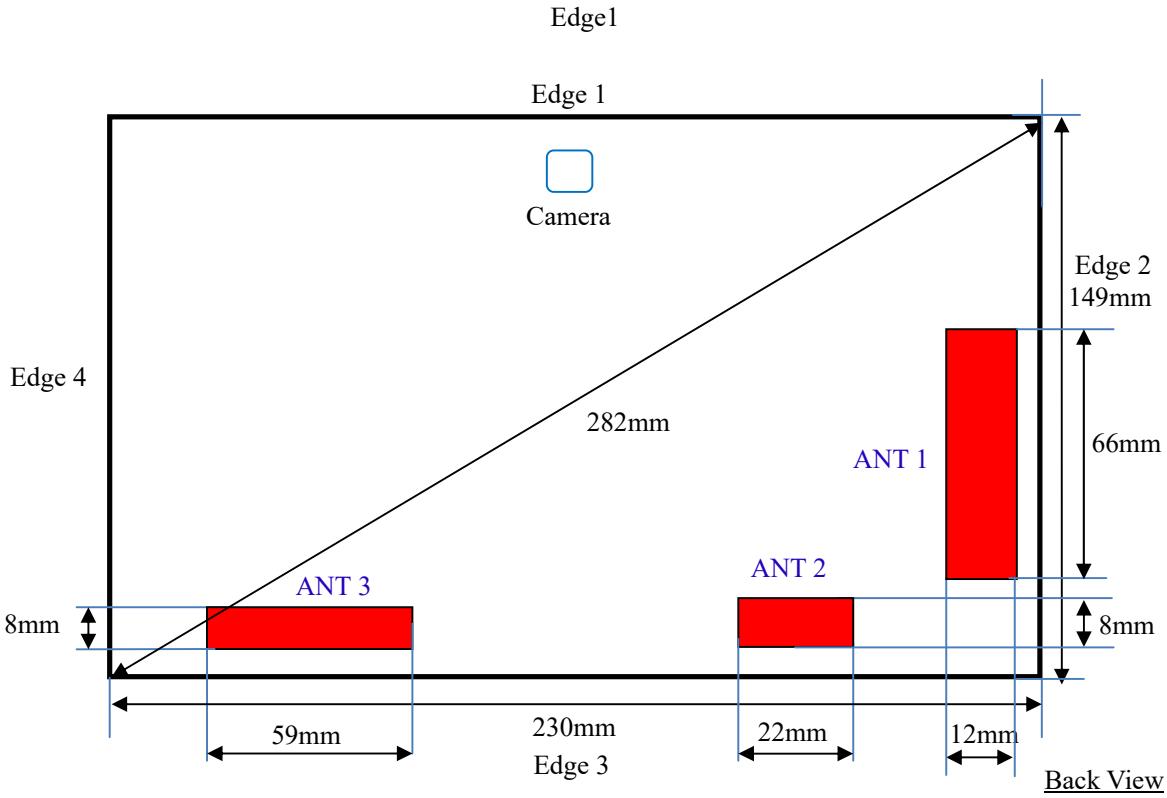
4 AUXILIARY EQUIPMENT DETAILS

AE: Battery	Description
Manufacturer:	N/A
Model:	466192
S/N:	S9N862F100MG510G21000046
capacity:	6700mAh
Voltage:	3.7V

5 TEST FACILITY

Site Description		
EMC Lab.	:	Accredited by CNAS, 2013.10.29 The certificate is valid until 2016.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS/CL01: 2006(identical to ISO/IEC17025: 2005) The Certificate Registration Number is L2291 Accredited by TUV Rheinland Shenzhen 2010.5.25 The Laboratory has been assessed according to the requirements ISO/IEC 17025
		Accredited by FCC, April 17, 2014 The Certificate Registration Number is 406365. Accredited by Industry Canada, March 05, 2010 The Certificate Registration Number is 4480A-2.
Name of Firm	:	EMTEK (SHENZHEN) CO., LTD.
Site Location	:	Bldg 69, Majialong Industry Zone,Nanshan District, Shenzhen, Guangdong, China

6 EUT ANTENNA LOCATIONS



Note:

ANT 1: 2G&3G&4G Main Antenna
ANT 2: BTWIFI Antenna
ANT 3: 2G&3G&4G Aux Antenna(RX only)

Sides for SAR Testing:

Mode	Bottom Face	Edge1	Edge2	Edge3	Edge4
GSM850	YES	YES	No	YES	YES
GSM1900	YES	YES	No	YES	YES
WCDMA V	YES	YES	No	YES	YES
WCDMA IV	YES	No	No	YES	YES
WCDMA II	YES	No	No	YES	YES
CDMA BC0	YES	YES	No	YES	YES
CDMA BC1	YES	YES	No	YES	YES
LTE Band17	YES	No	No	YES	YES
LTE Band13	YES	No	No	YES	YES

LTE Band5	YES	No	No	YES	YES
LTE Band4	YES	No	No	YES	YES
LTE Band2	YES	YES	No	YES	YES
LTE Band25	YES	No	No	YES	YES
WLAN2.4G	YES	No	No	YES	No
WLAN5G Band1	YES	No	No	YES	No
WLAN5G Band4	YES	No	No	YES	No

SAR test reduction and exclusion guidance:
1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Exposure Position	Wireless Interface	GSM850	GSM1900	
	Calculated Frequency	849MHz	1910MHz	
	Maximum power (dBm)	27.5	24	
	Maximum rated power(mW)	562.34	251.19	
Bottom Face	Separation distance(mm)	5	5	
	exclusion threshold	103.63	69.43	
	Testing required?	**Yes**	**Yes**	
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	27	27	
	exclusion threshold	19.19	12.86	
	Testing required?	**Yes**	**Yes**	
Edge 4	Separation distance(mm)	7	7	
	exclusion threshold	74.02	49.59	
	Testing required?	**Yes**	**Yes**	

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II
	Calculated Frequency	849MHz	1755MHz	1910MHz
	Maximum power (dBm)	24	23	23
	Maximum rated power(mW)	251.19	199.53	199.53
Bottom Face	Separation distance(mm)	5	5	5
	exclusion threshold	46.29	52.87	55.15
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	27	27	27
	exclusion threshold	8.57	9.79	10.21
	Testing required?	Yes	Yes	Yes
Edge 4	Separation distance(mm)	7	7	7
	exclusion threshold	33.06	37.76	39.39
	Testing required?	Yes	Yes	Yes

Exposure Position	Wireless Interface	CDMA BC0	CDMA BC1	
	Calculated Frequency	849MHz	1910MHz	
	Maximum power (dBm)	24.5	24.5	
	Maximum rated power(mW)	281.84	281.84	
Bottom Face	Separation distance(mm)	5	5	
	exclusion threshold	51.94	77.90	
	Testing required?	Yes	Yes	
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	27	27	
	exclusion threshold	9.62	14.43	
	Testing required?	Yes	Yes	
Edge 4	Separation distance(mm)	7	7	
	exclusion threshold	37.10	55.64	
	Testing required?	Yes	Yes	

Exposure Position	Wireless Interface	LTE Band 17	LTE Band 13	LTE Band 5
	Calculated Frequency	716MHz	787MHz	849MHz
	Maximum power (dBm)	23	23	23
	Maximum rated power(mW)	199.53	199.53	199.53
Bottom Face	Separation distance(mm)	5	5	5
	exclusion threshold	33.77	35.40	36.77
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	27	27	27
	exclusion threshold	6.25	6.56	6.81
	Testing required?	Yes	Yes	Yes
Edge 4	Separation distance(mm)	7	7	7
	exclusion threshold	24.12	25.29	26.26
	Testing required?	Yes	Yes	Yes

Exposure Position	Wireless Interface	LTE Band 4	LTE Band 2	LTE Band 25
	Calculated Frequency	1755MHz	1910MHz	1915MHz
	Maximum power (dBm)	23.5	24	23.5
	Maximum rated power(mW)	223.87	251.19	223.87
Bottom Face	Separation distance(mm)	5	5	5
	exclusion threshold	59.32	69.43	61.96
	Testing required?	Yes	Yes	Yes
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	27	27	27
	exclusion threshold	10.98	12.86	11.47
	Testing required?	Yes	Yes	Yes
Edge 4	Separation distance(mm)	7	7	7
	exclusion threshold	42.37	49.59	44.26
	Testing required?	Yes	Yes	Yes

Exposure Position	Wireless Interface	WLAN2.4G	WLAN5G Band 1	WLAN5G Band 4
	Calculated Frequency	2462MHz	5240	5825MHz
	Maximum power (dBm)	16	14.5	14
	Maximum rated power(mW)	39.81	28.18	25.12
Bottom Face	Separation distance(mm)	5	5	5
	exclusion threshold	12.49	12.90	12.12
	Testing required?	**Yes**	**Yes**	**Yes**
Edge 1	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 2	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 3	Separation distance(mm)	7	7	7
	exclusion threshold	8.92	9.22	8.66
	Testing required?	**Yes**	**Yes**	**Yes**
Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:
a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·($f_{(MHz)}$/150)] mW, at 100 MHz to 1500 MHz
b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	GSM850	GSM1900	
	Calculated Frequency	849MHz	1910MHz	
	Maximum power (dBm)	27.5	24	
	Maximum rated power(mW)	562.34	251.19	
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	64	64	
	exclusion threshold	242.03	248.54	
	Testing required?	**Yes**	**Yes**	
Edge 2	Separation distance(mm)	210	210	
	exclusion threshold	1068.39	1708.54	
	Testing required?	No	No	
Edge 3	Separation distance(mm)			
	exclusion threshold			

	Testing required?			
Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II
	Calculated Frequency	849MHz	1755MHz	1910MHz
	Maximum power (dBm)	24	23	23
	Maximum rated power(mW)	251.19	199.53	199.53
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	64	64	64
	exclusion threshold	242.03	253.23	248.54
	Testing required?	**Yes**	No	No
Edge 2	Separation distance(mm)	210	210	210
	exclusion threshold	1068.39	1713.23	1708.54
	Testing required?	No	No	No
Edge 3	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Exposure Position	Wireless Interface	CDMA BC0	CDMA BC1	
	Calculated Frequency	849MHz	1910MHz	
	Maximum power (dBm)	24.5	24.5	
	Maximum rated power(mW)	281.84	281.84	
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	64	64	
	exclusion threshold	242.03	248.54	
	Testing required?	**Yes**	**Yes**	
Edge 2	Separation distance(mm)	210	210	
	exclusion threshold	1068.39	1708.54	
	Testing required?	No	No	
Edge 3	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Exposure Position	Wireless Interface	LTE Band 17	LTE Band 13	LTE Band 5
	Calculated Frequency	716MHz	787MHz	849MHz
	Maximum power (dBm)	23	23	23
	Maximum rated power(mW)	199.53	199.53	199.53
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	64	64	64
	exclusion threshold	244.10	242.54	242.03
	Testing required?	No	No	No
Edge 2	Separation distance(mm)	210	210	210
	exclusion threshold	941.00	1008.55	1068.39
	Testing required?	No	No	No
Edge 3	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Exposure Position	Wireless Interface	LTE Band 4	LTE Band 2	LTE Band 25
	Calculated Frequency	1755MHz	1910MHz	1915MHz
	Maximum power (dBm)	23.5	24	23.5
	Maximum rated power(mW)	223.87	251.19	223.87
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	64	64	64
	exclusion threshold	253.23	248.54	248.39
	Testing required?	No	**Yes**	No
Edge 2	Separation distance(mm)	210	210	210
	exclusion threshold	1713.23	1708.54	1708.39
	Testing required?	No	No	No
Edge 3	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Edge 4	Separation distance(mm)			
	exclusion threshold			
	Testing required?			

Exposure Position	Wireless Interface	WLAN2.4G	WLAN5G Band 1	WLAN5G Band 4
	Calculated Frequency	2462MHz	5240	5825MHz
	Maximum power (dBm)	16	14.5	14
	Maximum rated power(mW)	39.81	28.18	25.12
Bottom Face	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 1	Separation distance(mm)	132	132	132
	exclusion threshold	915.60	885.53	882.15
	Testing required?	No	No	No
Edge 2	Separation distance(mm)	157	157	157
	exclusion threshold	1165.60	1135.53	1132.15
	Testing required?	No	No	No
Edge 3	Separation distance(mm)			
	exclusion threshold			
	Testing required?			
Edge 4	Separation distance(mm)	54	54	54
	exclusion threshold	135.60	105.53	102.15
	Testing required?	No	No	No

7 GUIDANCE STANDARD

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

FCC 47CFR §2.1093 Radiofrequency Radiation Exposure Evaluation: Portable Devices

ANSI C95.1, 1992: Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991)

IEEE Std 1528™-2013: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz

☒**KDB 447498 D01** Mobile Portable RF Exposure v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

☒ **KDB 248227 D01** 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS.

☒**KDB 616217 D04** SAR for laptop and tablets v01r02: SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers

KDB 941225 D01 3G SAR Procedures v03r01: 3G SAR MEAUREMENT PROCEDURES

KDB 941225 D05 SAR for LTE Devices v02r05: SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES

Remark:
This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 11 of this test report are below limits specified in the relevant standards for the tested bands only.

8 RF EXPOSURE

8.1 LIMITS

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

8.2 EVALUATION

☒According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[25] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[26]
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer

simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

8.3 SAR TESTING FOR TABLET

This device can be used also in full sized tablet exposure conditions, due to its size>20cm. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliace with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is rquired for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

8.4 MAXIMUM TUNE-UP LIMIT

For Classic Bluetooth:

Mode	Channel	Maximum Average power (dBm)
Bluetooth 2.0/2.1/3.0 (GFSK)	Low	-2
	Mid	-1
	High	-0
Bluetooth 2.0/2.1/3.0 (Pi/4-DQPSK)	Low	-2
	Mid	-1
	High	-0
Bluetooth 2.0/2.1/3.0(8DPSK)	Low	-2
	Mid	-1
	High	-0

For BLE:

Mode	Channel	Maximum Average power (dBm)
Bluetooth 4.0 (BLE)	Low	-2
	Mid	-2
	High	-2

For Wifi2.4G:

Mode	Frequency (GHz)	Channel	Maximum Average power (dBm)
11b	2.412	Low	16
	2.437	Mid	16
	2.462	High	16
11g	2.412	Low	15.5
	2.437	Mid	15.5
	2.462	High	15.5
11n (HT20)	2.412	Low	15
	2.437	Mid	15
	2.462	High	15

For Wifi5G:

Mode	Band	Maximum Average power (dBm)
11a	UNII Band I	14.5
	UNII Band III	14
802.11n-HT20	UNII Band I	14
	UNII Band III	13.5
802.11n-HT40	UNII Band I	13
	UNII Band III	11.5
802.11ac-VHT20	UNII Band I	14
	UNII Band III	13
802.11ac-VHT40	UNII Band I	13.5
	UNII Band III	13
802.11ac-VHT80	UNII Band I	11
	UNII Band III	10

For GSM:

Mode	Maximum Burst Average Power (dBm)			
	GSM850		GSM1900	
Output power status	Full Power Mode	Reduced Power Mode	Full Power Mode	Reduced Power Mode
GPRS (GMSK, 1 Tx slot)	33.50	30.50	30.00	27
GPRS (GMSK, 2 Tx slots)	33.50	30.50	30.00	27
EDGE (8PSK, 1 Tx slot)	29.00	26	26.00	23
EDGE (8PSK, 2 Tx slots)	29.00	26	26.00	23
EDGE (8PSK, 3 Tx slots)	28.50	25.5	25.50	22.5
EDGE (8PSK, 4 Tx slots)	28.50	25.5	25.50	22.5

For CDMA:

Mode	Maximum Average power(dBm)			
	CDMA2000 BC0		CDMA2000 BC1	
Output power status	Full Power Mode	Reduced Power Mode	Full Power Mode	Reduced Power Mode
1xRTT RC1 SO55	24.5	22.5	24.5	22.5
1xRTT RC3 SO55	24.5	22.5	24.5	22.5
1xRTT RC3 SO32(+ F-SCH)	24.5	22.5	24.5	22.5
1xRTT RC3 SO32(+SCH)	24.5	22.5	24.5	22.5
1xEVDO RTAP 153.6Kbps	24.5	22.5	24.5	22.5
1xEVDO RETAP 4096Bits	24.5	22.5	24.5	22.5

For WCDMA:

Mode	Maximum Average power(dBm)					
	WCDMA V		WCDMA IV		WCDMA II	
Output power status	Full Power Mode	Reduced Power Mode	Full Power Mode	Reduced Power Mode	Full Power Mode	Reduced Power Mode
AMR/RMC 12.2Kbps	24	21	23	20	23	20
HSDPA	23.5	20.5	22.5	19.5	22.5	19.5
DC-HSDPA	23.5	20.5	22.5	19.5	22.5	19.5
HSUPA	23.5	20.5	22.5	19.5	22.5	19.5

For LTE BAND 2:

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Reduced Power Mode
LTE Band2	QPSK	5	≤8	0	24	22
		5	>8	0	24	22
		10	≤12	0	24	22
		10	>12	0	24	22
		15	≤16	0	24	22
		15	>16	0	24	22
		20	≤18	0	24	22
		20	>18	0	24	22
	16QAM	5	≤8	0	24	22
		5	>8	0	24	22
		10	≤12	0	24	22
		10	>12	0	24	22
		15	≤16	0	24	22
		15	>16	0	24	22
		20	≤18	0	24	22
		20	>18	0	24	22

For LTE BAND 4

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Full Power Mode
LTE Band4	QPSK	5	≤8	0	23.5	21.5
		5	>8	0	23.5	21.5
		10	≤12	0	23.5	21.5
		10	>12	0	23.5	21.5
		15	≤16	0	23.5	21.5
		15	>16	0	23.5	21.5
		20	≤18	0	23.5	21.5
		20	>18	0	23.5	21.5
	16QAM	5	≤8	0	23.5	21.5
		5	>8	0	23.5	21.5
		10	≤12	0	23.5	21.5
		10	>12	0	23.5	21.5
		15	≤16	0	23.5	21.5
		15	>16	0	23.5	21.5
		20	≤18	0	23.5	21.5
		20	>18	0	23.5	21.5

For LTE BAND 5

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Full Power Mode
LTE Band5	QPSK	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21
	16QAM	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21

For LTE BAND 13

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Full Power Mode
LTE Band13	QPSK	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21
	16QAM	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21

For LTE BAND 17

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Full Power Mode
LTE Band17	QPSK	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21
	16QAM	5	≤8	0	23	21
		5	>8	0	23	21
		10	≤12	0	23	21
		10	>12	0	23	21

For LTE BAND 25

BAND	Modulation	Bandwidth	RB Size	MPR	Maximum Average power(dBm)	
					Full Power Mode	Full Power Mode
LTE Band25	QPSK	5	≤8	0	23.5	21.5
		5	>8	0	23.5	21.5
		10	≤12	0	23.5	21.5
		10	>12	0	23.5	21.5
		15	≤16	0	23.5	21.5
		15	>16	0	23.5	21.5
		20	≤18	0	23.5	21.5
		20	>18	0	23.5	21.5
	16QAM	5	≤8	0	23.5	21.5
		5	>8	0	23.5	21.5
		10	≤12	0	23.5	21.5
		10	>12	0	23.5	21.5
		15	≤16	0	23.5	21.5
		15	>16	0	23.5	21.5
		20	≤18	0	23.5	21.5
		20	>18	0	23.5	21.5

9 SPECIFIC ABSORPTION RATE (SAR)

9.1 INTRODUCTION

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

9.2 SAR DEFINITION

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where: σ is the conductivity of the tissue ρ is the mass density of tissue and E is the RMS electrical field strength.

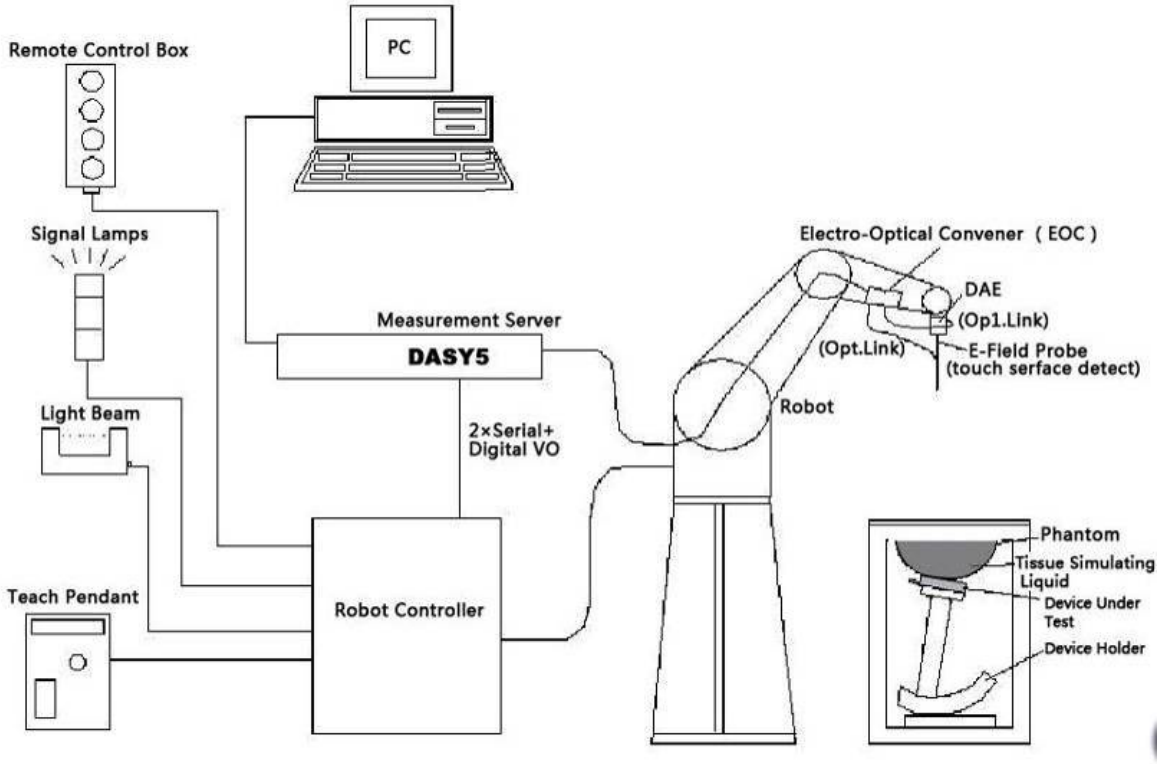
However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

10 SAR MEASUREMENTS SYSTEM CONFIGURATION

10.1 SAR MEASUREMENT SET-UP

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.



Picture 1. SAR Lab Test Measurement Set-up

10.2 DASY5 E-FIELD PROBE SYSTEM

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection turning a software approach and looks for the maximum using 2nd ord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: EX3DV4

Frequency Range: 10MHz — 6.0GHz (EX3DV4)

Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz

Linearity: ± 0.2 dB (30 MHz to 6 GHz) for EX3DV4

Dynamic Range: 10 mW/kg — 100W/kg

Probe Length: 330 mm

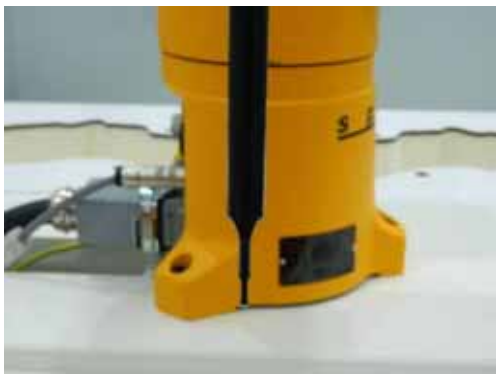
Probe Tip Length: 20 mm

Body Diameter: 12 mm

Tip Diameter: 2.5 mm

Tip-Center: 1 mm

Application: SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields



Picture 2 E-field Probe

10.3 E-FIELD PROBE CALIBRATION

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.
The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mw/ cm^2.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:
Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
ΔT = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m^3).

10.4 OTHER TEST EQUIPMENT

10.4.1 Data Acquisition Electronics (DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.
The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Picture 3: DAE

10.4.2 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture 4 DASY 5

10.4.3 Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chip disk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.

Picture 5 Server for DASY 5

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is

reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

10.4.4 Device Holder for Phantom

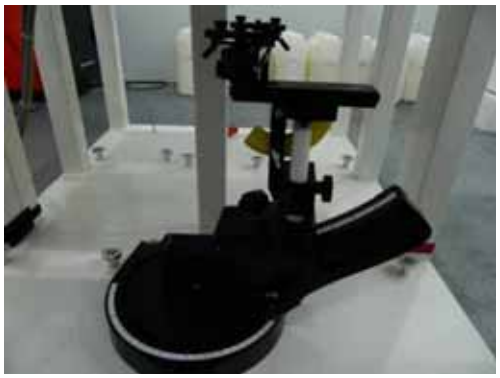
The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

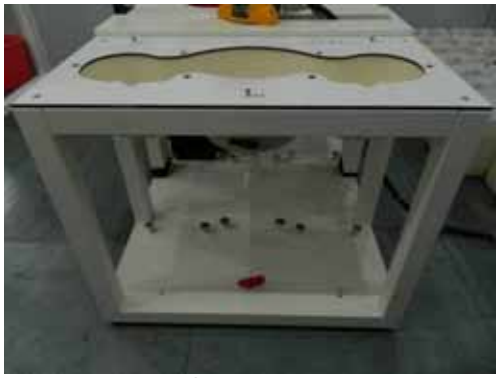


Picture 6: Device Holder

10.4.5 Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness:	2 ± 0. 2 mm
Filling Volume:	Approx. 25 liters
Dimensions:	810 x l000 x 500 mm (H x L x W)
Available:	Special



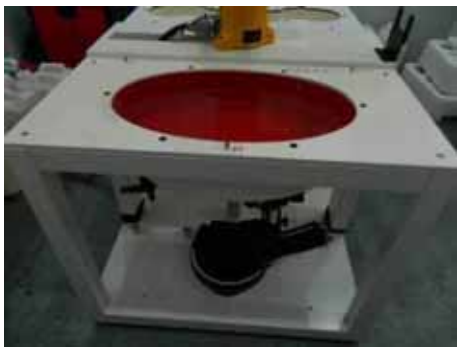
Picture 7: SAM Twin Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

Shell Thickness 2±0.2 mm

Filling Volume Approx. 30 liters

Dimensions 190×600×0 mm (H x L x W)



Picture 8.ELI4 Phantom

10.5 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search

• extrapolation

• boundary correction

• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

Frequency	Maximum Area Scan Resolution (mm) (Δxarea, Δyarea)	Maximum Zoom Scan Resolution (mm) (Δxzoom, Δyzoom)	Maximum Zoom Scan Spatial Resolution (mm) Δzzoom(n)	Minimum Zoom Scan Volume (mm) (x,y,z)
≤2 GHz	≤15	≤8	≤5	≥ 30
2-3 GHz	≤12	≤5	≤5	≥30
3-4 GHz	≤12	≤5	≤4	≥28
4-5 GHz	≤10	≤4	≤3	≥25
5-6 GHz	≤10	≤4	≤2	≥22

10.6 DATA STORAGE AND EVALUATION

10.6.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device set up, the parameter can be corrected afterwards and the data can be re-evaluated.
The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a loss less media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

10.6.2 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity $Norm_i$, a_{i0}, a_{i1}, a_{i2}

- Conversion factor $ConvF_i$

- Diode compression point Dcp_i

Device parameters: - Frequency f

- Crest factor cf

Media parameters: - Conductivity
- Density

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$\mathbf{V_i = U_i + U_i^2 \cdot c f / dcp_i}$$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$\mathbf{U_i}$ = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

$\mathbf{dcp_i}$ = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be

evaluated:

E-field probes: $\mathbf{E_i = (V_i / Norm_i \cdot ConvF)^{1/2}}$

H-field probes: $\mathbf{H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f}$

With $\mathbf{V_i}$ = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)

[mV/(V/m)2] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot})\ 2 \cdot \sigma / (\rho \cdot 1000)$$

with **SAR** = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

= conductivity in [mho/m] or [Siemens/m]

= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \text{ or } P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total electric field strength in V/m ; H_{tot} = total magnetic field strength in A/m

10.7 TISSUE-EQUIVALENT LIQUID

10.7.1 Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt and Glycol. The liquid has previously been proven to be suited for worst-case. The Table 3 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 3: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY (Body) 900MHz
Water	52.3
Glycol	45.1
Salt	1.5
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=900MHz ε=55.0 σ=1.05

MIXTURE%	FREQUENCY (Body) 1750MHz
Water	69.93
Glycol	29.96
Salt	0.11
Dielectric Parameters Target Value	f=1750MHz ε=53.4 σ=1.49

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.93
Glycol monobutyl	29.97
Salt	0.1
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY (Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.7 σ=1.95

MIXTURE%	FREQUENCY (Body) 5GHz
Water	75.68
DGBE	4.42
Triton X-100	19.47
Salt	0.43
Dielectric Parameters Target Value	f=5200MHz ε=49.00 σ=5.30 f=5300MHz ε=48.90 σ=5.42 f=5500MHz ε=48.60 σ=5.65 f=5600MHz ε=48.50 σ=5.77 f=5800MHz ε=48.20 σ=6.00

10.7.2 Tissue-equivalent Liquid Properties

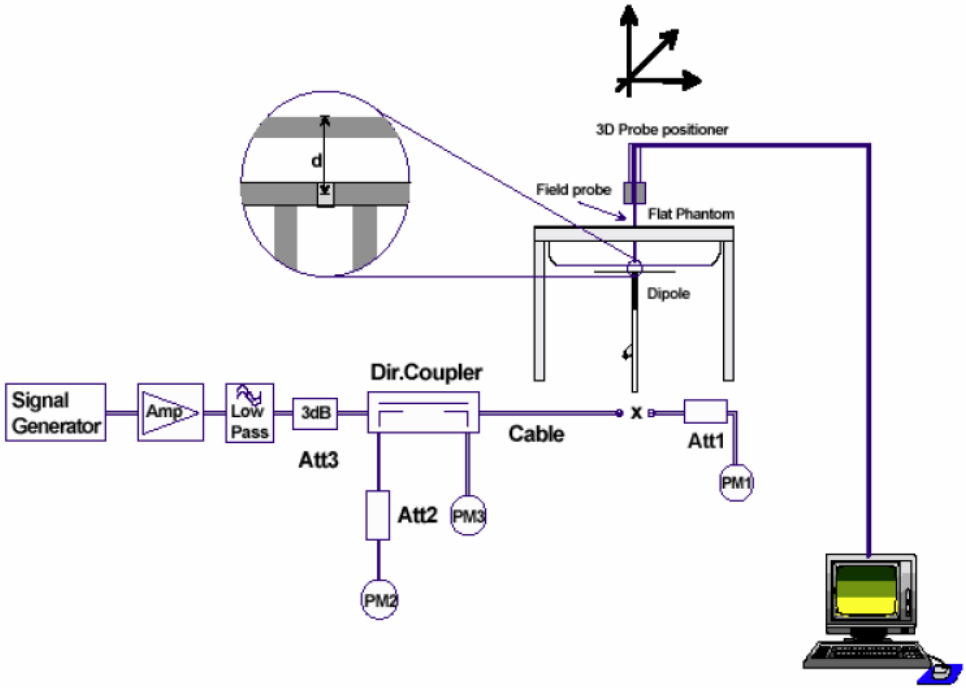
Table 4: Dielectric Performance of Tissue Simulating Liquid

Test Date	Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)
2016/7/9	750	Body	22.6	0.966	55.259	0.96	55.50	0.63	-0.43	±5
2016/7/7	900	Body	22.8	1.061	55.041	1.05	55.00	1.05	0.07	±5
2016/7/13	1750	Body	22.7	1.492	51.975	1.49	53.40	0.13	-2.67	±5
2016/7/11	1950	Body	22.5	1.592	51.829	1.52	53.30	4.74	-2.76	±5
2016/7/14	2450	Body	22.8	2.010	52.980	1.95	52.70	3.08	0.53	±5
2016/7/15	5200	Body	22.6	5.194	50.928	5.30	49.00	-2.00	3.93	±5
2016/7/15	5800	Body	22.6	6.178	49.756	6.00	48.20	2.97	3.23	±5

10.8 SYSTEM CHECK

10.8.1 Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 6. System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %). System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.



Picture 10. System Check Set-up

Justification for Extended SAR Dipole Calibrations
Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01 v01r04:
Table 5: Antenna Parameters with Body Tissue Simulating Liquid

Dipole D750V3 SN: 1078				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-6-23	-36.586	/	49.557	/
2015-6-21	-36.043	-1.48	50.213	0.656
2016-6-18	-36.747	0.44	49.431	-0.126
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-6-23	-26.948	/	54.67	/
2015-6-21	-26.253	-2.58	55.384	0.714
2016-6-18	-26.891	-0.21	54.538	-0.132

Dipole D900V2 SN: 1d162				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-01-14	-28.581	/	47.850	/
2015-01-11	-28.332	0.87	47.396	-0.454
2016-01-10	-28.688	-1.26	47.861	0.465
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-01-14	-30.675	/	52.545	/
2015-01-11	-30.317	1.17	52.028	-0.517
2016-01-10	-30.692	-1.24	52.735	0.707

Dipole D1750V2 SN: 1023				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-6-17	-28.439	/	46.377	/
2015-6-15	-27.506	3.28	46.979	0.602
2016-6-11	-28.386	-3.20	46.251	-0.728
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-6-17	-37.951	/	51.230	/
2015-6-15	-37.024	2.44	51.855	0.625
2016-6-11	-37.685	-1.79	51.079	-0.776

Dipole D1950V3 SN: 1151				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2015-01-10	-26.451	/	45.793	/
2015-01-06	-26.036	1.57	45.311	-0.482
2016-01-03	-26.597	-2.15	45.883	0.572
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ

2015-01-10	-33.477	/	49.910	/
2015-01-06	-33.011	1.39	49.527	-0.383
2016-01-03	-33.781	-2.33	49.986	0.459

Dipole D2450V2 SN: 927				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-13	-24.935	/	55.234	/
2015-1-11	-24.769	0.67	54.383	-0.851
2015-1-9	-25.103	-1.35	55.376	0.993
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2014-1-13	-26.331	/	51.422	/
2015-1-11	-26.153	0.68	51.016	-0.406
2015-1-9	-26.386	-0.89	51.468	0.452

Dipole D5GHzV2 SN: 1169					
5200MHz	Body Liquid				
	Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
	2014-1-7	-22.524	/	49.590	/
	2015-1-11	-22.158	1.62	50.335	0.745
	2016-1-9	-21.946	0.96	50.837	0.502
	Head Liquid				
	Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
	2014-1-7	-21.669	/	49.711	/
	2015-1-11	-21.083	2.70	50.130	0.419
	2016-1-9	-20.847	1.12	50.746	0.616
5800MHz	Body Liquid				
	Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
	2014-1-7	-24.125	/	55.896	/
	2015-1-11	-23.978	0.61	56.534	0.638
	2016-1-9	-23.248	3.04	55.967	0.567
	Head Liquid				
	Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
	2014-1-7	-23.351	/	55.691	/
	2015-1-11	-23.213	0.59	56.217	0.526
	2016-1-9	-23.054	0.68	55.843	-0.374

10.8.2 System Check Results

Table 6: System Check for Head /BodyTissue Simulating Liquid

Date	Frequency (MHz)2	Tissue Type2	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2016/7/9	750	Body	250	1078	3873	1341	2.19	8.63	8.76	1.51
2016/7/7	900	Body	250	1d162	3873	1341	2.79	10.70	11.16	4.30
2016/7/13	1750	Body	250	1023	3873	1341	9.56	37.90	38.24	0.90
2016/7/11	1950	Body	250	1151	3873	1341	10.02	38.80	40.08	3.30
2016/7/14	2450	Body	250	927	3873	1341	12.50	50.40	50	-0.79
2016/7/15	5200	Body	100	1169	3873	1341	7.59	73.80	75.9	2.85
2016/7/15	5800	Body	100	1169	3873	1341	7.53	74.30	75.3	1.35

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 09.07.2016

SystemPerformanceCheck-D750V3-MSL-160709

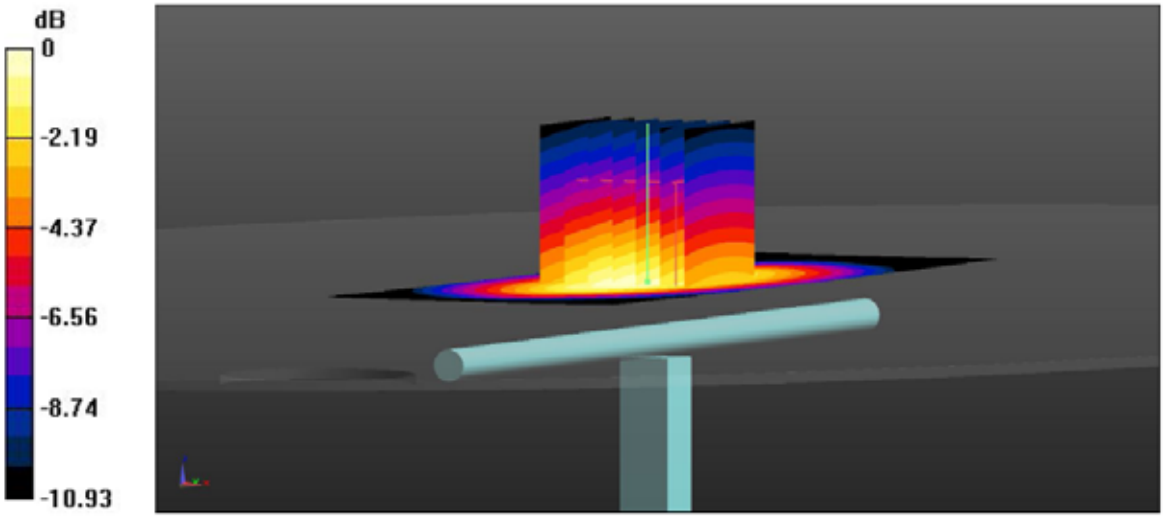
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750_160709
Medium parameters used: f = 750 MHz; σ = 0.966 S/m; ε_r = 55.259; ρ = 1000 kg/m^3
Ambient Temperature: 23.1 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.77, 9.77, 9.77); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 750MHz/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (41x111x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.05 W/kg

System Performance Check at Frequency at 750MHz/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.331 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.61 W/kg
SAR(1 g) = 2.19 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 3.06 W/kg



0 dB = 3.06 W/kg = 4.86 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 07.07.2016

SystemPerformanceCheck-D900V2-MSL-160707

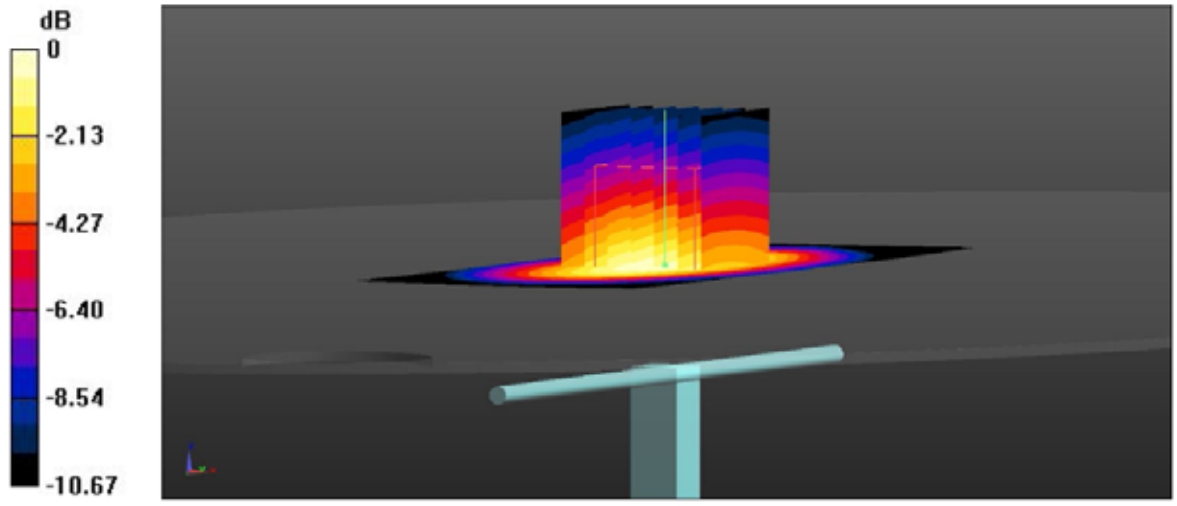
Communication System: UID 0, CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: MSL_900_160707
Medium parameters used: f = 900 MHz; σ = 1.061 S/m; ε_r = 55.041; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.41, 9.41, 9.41); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 900MHz/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.57 W/kg

System Performance Check at Frequency at 900MHz/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.372 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 4.21 W/kg
SAR(1 g) = 2.79 W/kg; SAR(10 g) = 1.83 W/kg
Maximum value of SAR (measured) = 3.58 W/kg



0 dB = 3.58 W/kg = 5.54 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 13.07.2016

SystemPerformanceCheck-D1750V2-MSL-160713

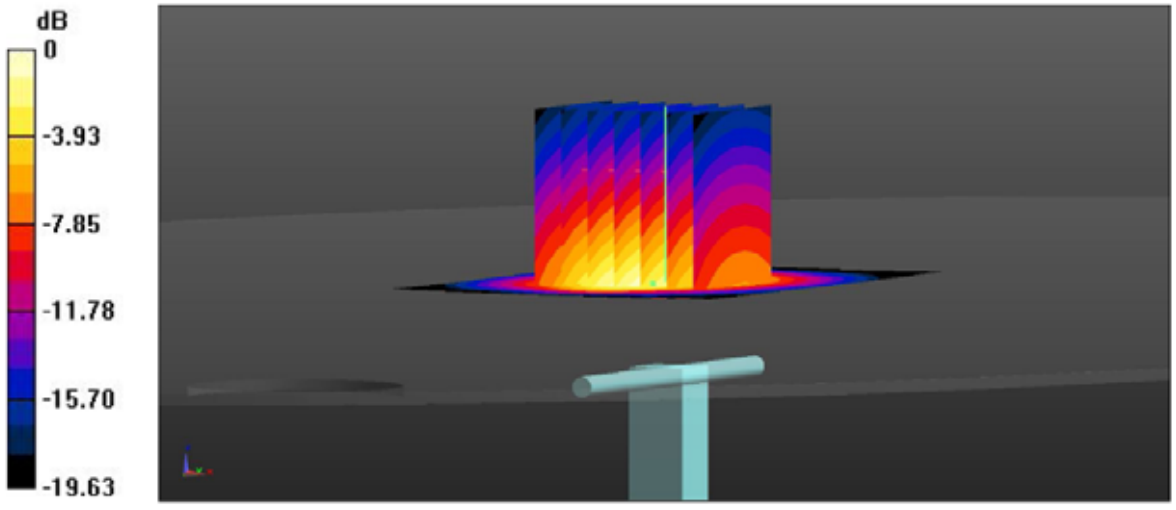
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160713
Medium parameters used: f = 1750 MHz; σ = 1.492 S/m; ε_r = 51.975; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.7 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.86, 7.86, 7.86); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 1750MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.4 W/kg

System Performance Check at Frequency at 1750MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.951 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 9.56 W/kg; SAR(10 g) = 4.83 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

SystemPerformanceCheck-D1950V3-MSL-160711

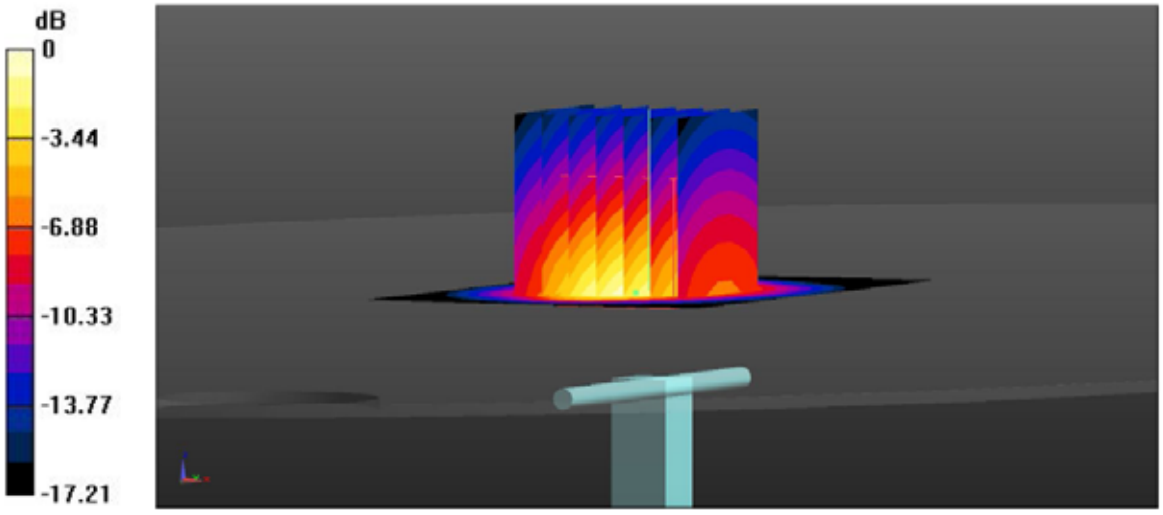
Communication System: UID 0, CW (0); Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160711
Medium parameters used: f = 1950 MHz; σ = 1.592 S/m; ε_r = 51.829; ρ = 1000 kg/m^3
Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 1950MHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.8 W/kg

System Performance Check at Frequency at 1950MHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.981 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 10.02 W/kg; SAR(10 g) = 5.33 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 14.07.2016

SystemPerformanceCheck-D2450V2-MSL-160714

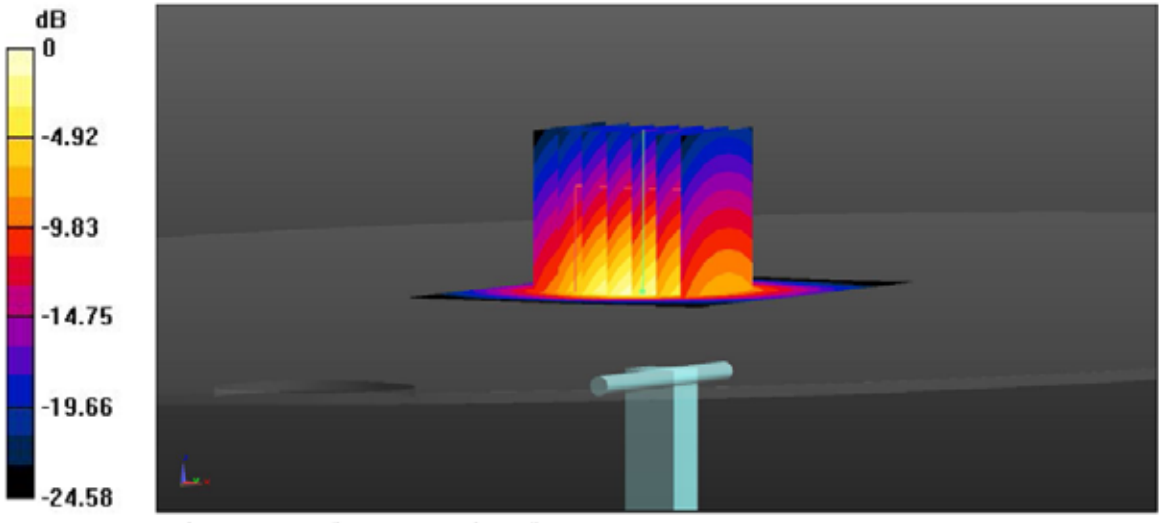
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_160714
Medium parameters used: f = 2450 MHz; σ = 2.01 S/m; ε_r = 52.98; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.30, 7.30, 7.30); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 2450MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Area Scan (51x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 17.3 W/kg

System Performance Check at Frequency at 2450MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.505 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 23.6 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 17.2 W/kg



0 dB = 17.2 W/kg = 12.36 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 15.07.2016

SystemPerformanceCheck-D5GHzV2-5200MHz-MSL-160715

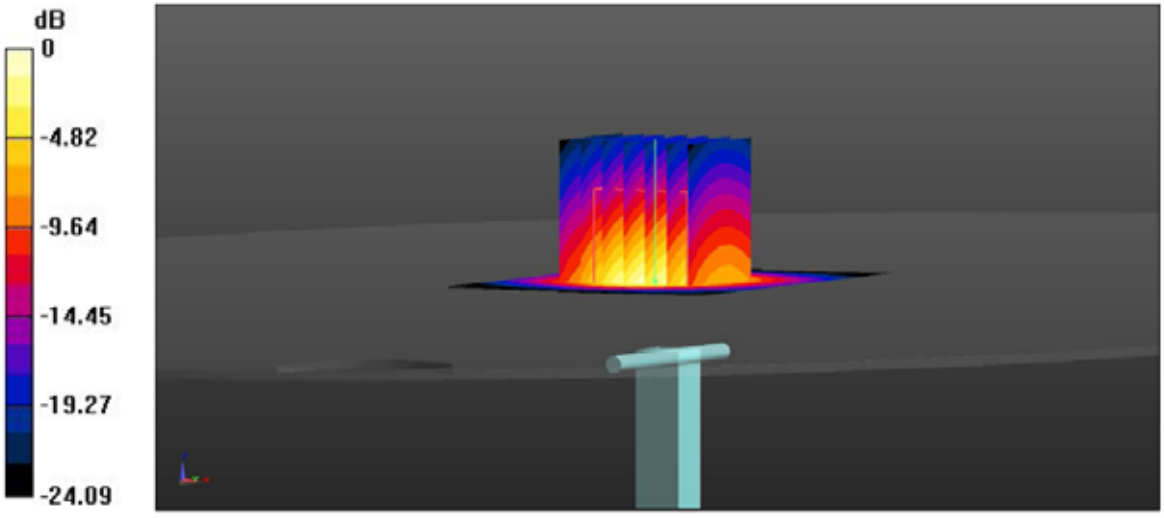
Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: MSL_5G_160715
Medium parameters used: f = 5200 MHz; σ = 5.194 S/m; ε_r = 50.928; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.40, 4.40, 4.40); Calibrated: 26.08.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 5200MHz/d=10mm, Pin=100mW, dist=1.4mm (EX-Probe)/Area Scan (61x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 19.4 W/kg

System Performance Check at Frequency at 5200MHz/d=10mm, Pin=100mW, dist=1.4mm (EX-Probe)/Zoom Scan (11x11x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 64.5 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 30.0 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 19.2 W/kg



0 dB = 19.2 W/kg = 12.83 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 15.07.2016

SystemPerformanceCheck-D5GHzV2-5800MHz-MSL-160715

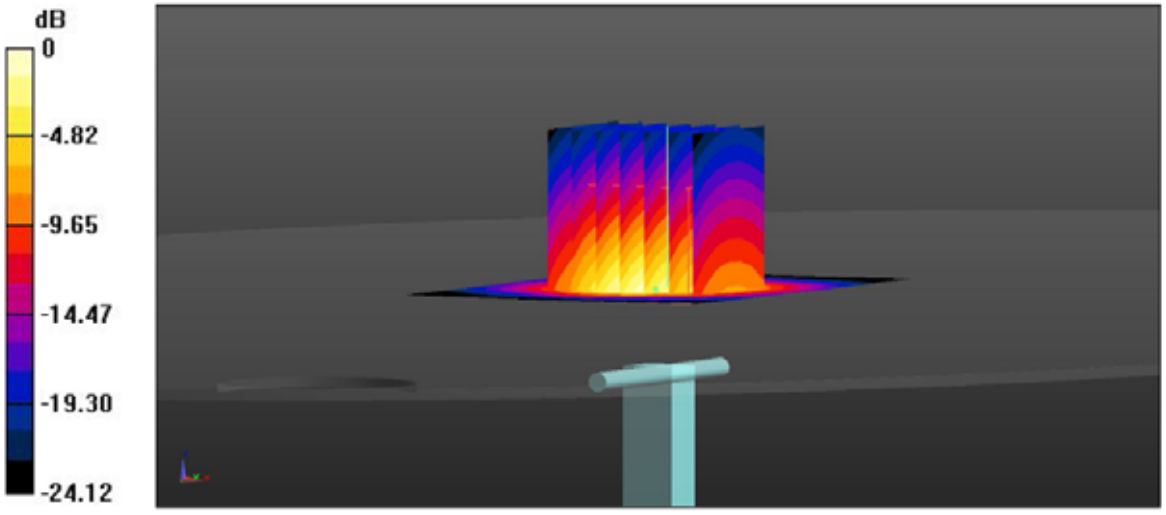
Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: MSL_5G_160715
Medium parameters used: f = 5800 MHz; σ = 6.178 S/m; ε_r = 49.756; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.40, 4.40, 4.40); Calibrated: 26.08.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 5800MHz/d=10mm, Pin=100mW, dist=1.4mm (EX-Probe)/Area Scan (61x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 19.9 W/kg

System Performance Check at Frequency at 5800MHz/d=10mm, Pin=100mW, dist=1.4mm (EX-Probe)/Zoom Scan (11x11x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 57.513 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

10.8.3 System Validation

The SAR system must be validated against its performance specifications before it is deployed. When SAR probes, system components or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such components.

Table 7: System Validation

Probe SN.	Liquid Name	Validation Date	Frequency Point (MHz)	Permittivity ε	Conductivity σ(s/m)	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
3873	750MHz (body)	2016/7/9	750	55.50	0.96	PASS	PASS	PASS	GMSK	PASS	N/A
3873	900MHz (body)	2016/7/7	900	55.00	1.05	PASS	PASS	PASS	GMSK	PASS	N/A
3873	1750MHz (body)	2016/7/13	1750	53.40	1.49	PASS	PASS	PASS	GMSK	PASS	N/A
3873	1900MHz (body)	2016/7/11	1950	53.30	1.52	PASS	PASS	PASS	GMSK	PASS	N/A
3873	2450MHz (body)	2016/7/14	2450	52.70	1.95	PASS	PASS	PASS	OFDM	N/A	PASS
3873	5GHz (body)	2016/7/15	5200	49.00	5.30	PASS	PASS	PASS	OFDM	N/A	PASS
3873	5GHz (body)	2016/7/15	5800	48.20	6.00	PASS	PASS	PASS	OFDM	N/A	PASS

11 MEASUREMENT PROCEDURES

11.1 GENERAL DESCRIPTION OF TEST PROCEDURES

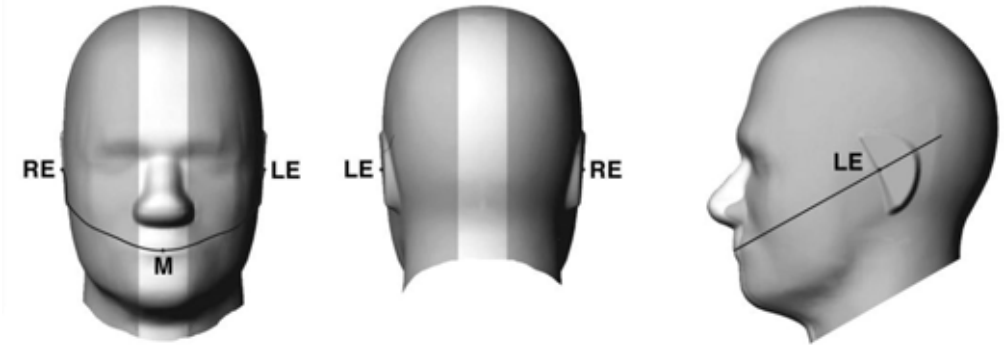
For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.
For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode.

11.2 MEASUREMENT VARIABILITY

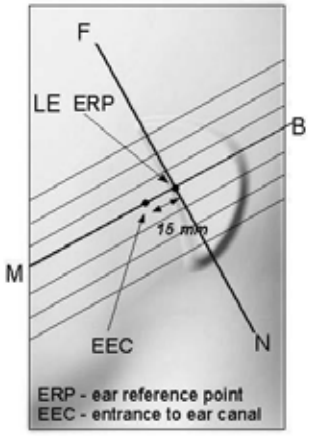
Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.
SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg.

11.3 TEST POSITIONS REQUIREMENTS

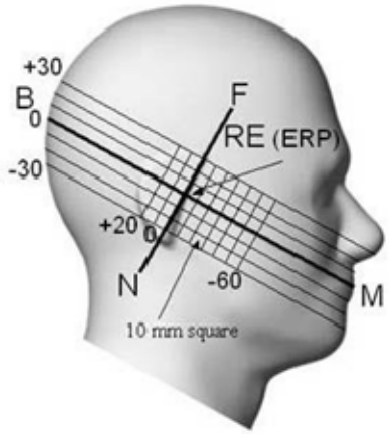
(1) Ear and handset reference point
Picture11 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Picture12.The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Picture13). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Picture12. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.



Picture11 Front, back, and side views of SAM twin phantom



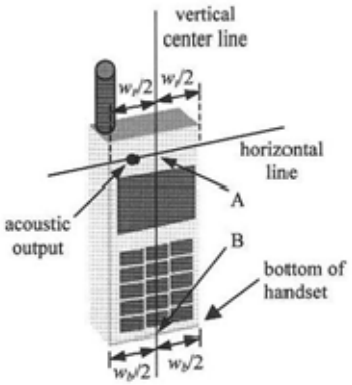
Picture12 Close-up side view of phantom showing the ear region.



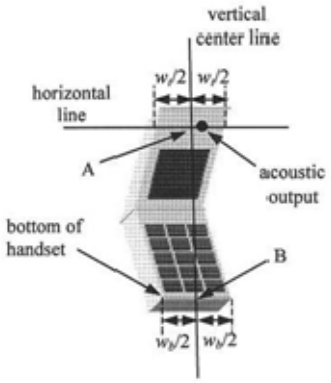
Picture13 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

(2) Definition of the cheek position

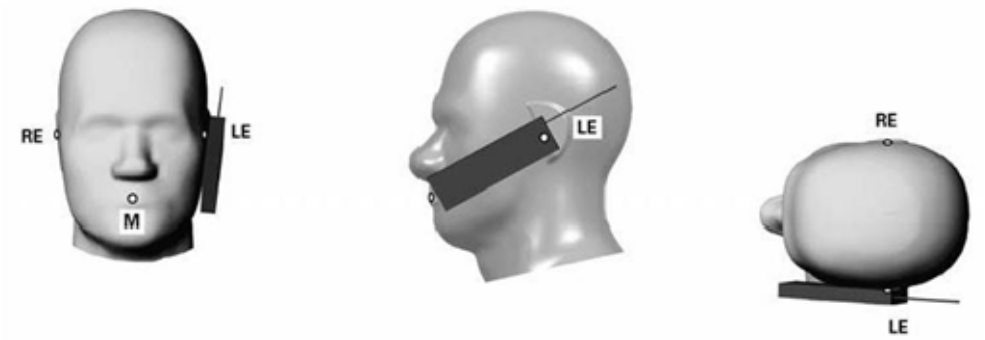
1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Picture 14 and Picture 15), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Picture 14). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Picture 15), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Picture 16), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Picture 16. The actual rotation angles should be documented in the test report.



Picture14 Handset vertical and horizontal reference lines—“fixed case



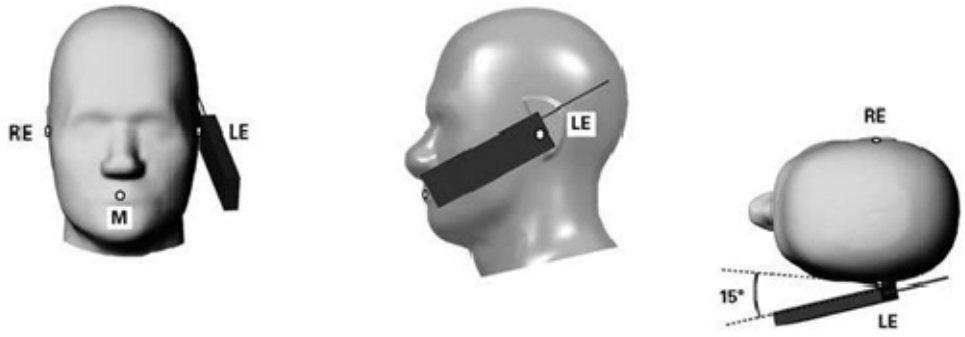
Picture15 Handset vertical and horizontal reference lines—“clam-shell case”



Picture16 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

(3) Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Picture 17. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

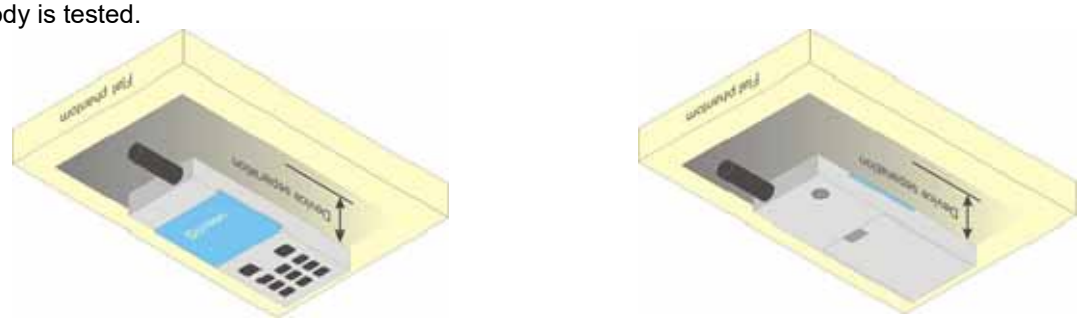


Picture17 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

(4)Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Picture 18). Per KDB 648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are

carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.
Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.



Picture18 Body Worn Position

(5)Wireless Router
Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC HDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.
When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

11.4 TEST RESULTS

11.4.1 Conducted Power Results

The output average power of WiFi 2.4G is as following:

Mode	Channel	Data rate (Mbps)	Power Setting	Average Power (dBm)
11b	1	1	-	15.32
	6	1	-	15.41
	11	1	-	15.53
11g	1	6	-	14.69
	6	6	-	14.72
	11	6	-	14.83
11n HT20	1	MCS0	-	14.12
	6	MCS0	-	14.07
	11	MCS0	-	14.25

Note：The maximum average output power at higher data rates is smaller than than those measured at the lowest data rate.

The output average power of WiFi 5G is as following:

Mode	Channel	Data rate (Mbps)	Power Setting	Average Power (dBm)
11a	36	6	-	14.20
	40	6	-	14.13
	44	6	-	14.02
	48	6	-	14.05
	149	6	-	13.56
	153	6	-	13.53
	157	6	-	13.48
	161	6	-	13.51
	165	6	-	13.57
802.11n-HT20	36	MCS0	-	13.43
	40	MCS0	-	13.25
	44	MCS0	-	13.02
	48	MCS0	-	13.10
	149	MCS0	-	12.85
	153	MCS0	-	12.75
	157	MCS0	-	12.59

	161	MCS0	-	12.39
	165	MCS0	-	12.43
802.11n-HT40	38	MCS0	-	12.35
	46	MCS0	-	12.3
	151	MCS0	-	11.92
	159	MCS0	-	11.86
802.11ac-VHT20	36	MCS0	-	13.21
	40	MCS0	-	13.25
	44	MCS0	-	13.21
	48	MCS0	-	13.48
	149	MCS0	-	12.42
	153	MCS0	-	12.38
	157	MCS0	-	12.52
	161	MCS0	-	12.05
	165	MCS0	-	12.13
802.11ac-VHT40	38	MCS0	-	12.93
	46	MCS0	-	12.8
	151	MCS0	-	12.74
	159	MCS0	-	12.51
802.11ac-VHT80	42	MCS0	-	10.24
	155	MCS0	-	9.59

Note：The maximum average output power at higher data rates is smaller than than those measured at the lowest data rate.

The output average power of BT (DSS) is as following:

Mode	Channel 0 (dBm)	Channel 39 (dBm)	Channel 78 (dBm)
1Mbps	-2.78	-1.11	-0.28
2Mbps	-3.67	-2.14	-1.73
3Mbps	-3.12	-1.55	-1.22

The output average power of BT (DTS) is as following:

Mode	Channel 0 (dBm)	Channel 19 (dBm)	Channel 39 (dBm)
GFSK	-3.04	-2.47	-3.46

For GSM(Full Power):

Burst Average Power test result as bellowing:

Band	GSM850			PCS1900		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GPRS Multi-Slot Class8 (1 Uplink)	32.97	33.34	33.32	29.50	29.62	29.70
GPRS Multi-Slot Class10 (2 Uplink)	32.88	33.07	33.11	29.37	29.41	29.57
EDGE Multi-Slot Class8 (1 Uplink)	28.56	28.62	28.69	25.07	25.37	25.39
EDGE Multi-Slot Class10 (2 Uplink)	28.29	28.36	28.47	24.95	25.25	25.31
EDGE Multi-Slot Class11 (3 Uplink)	28.10	28.23	28.25	24.81	25.11	25.10
EDGE Multi-Slot Class12 (4 Uplink)	27.91	27.90	27.98	24.67	24.95	25.03
Note: GPRS, CS1 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link EDGE, MCS5 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link						

Source-based Time Averaged Burst Power as bellowing:

Band	GSM850				PCS1900			
Channel	128	189	251	Time average factor	512	661	810	Time average factor
Frequency(MHz)	824.2	836.4	848.8		1850.2	1880	1909.8	
GPRS Multi-Slot Class8 (1 Uplink)	23.97	24.34	24.32	-9.03	20.50	20.62	20.70	-9.03
GPRS Multi-Slot Class10 (2 Uplink)	26.88	27.07	27.11	-6.02	23.37	23.41	23.57	-6.02
EDGE Multi-Slot Class8 (1 Uplink)	19.56	19.62	19.69	-9.03	16.07	16.37	16.39	-9.03
EDGE Multi-Slot Class10 (2 Uplink)	22.29	22.36	22.47	-6.02	18.95	19.25	19.31	-6.02
EDGE Multi-Slot Class11 (3 Uplink)	23.84	23.97	23.99	-4.26	20.55	20.85	20.84	-4.26

EDGE Multi-Slot Class12 (4 Uplink)	24.91	24.90	24.98	-3.01	21.67	21.95	22.03	-3.01

Note: 1 uplink , Time average factor =10*log(1/8)=-9.03dB,
2 uplink , Time average factor =10*log(2/8)=-6.02dB,
3 uplink, Time average factor =10*log(3/8)=-4.26dB,
4 uplink, Time average factor =10*log(4/8)=-3.01dB,
Source based time average power = Burst Average power + Time Average factor

For WCDMA(Full Power):

WCDMA Band V:

Band		WCDMA V		
TX Channel		4132	4182	4233
Rx Channel		4357	4407	4458
Frequency (MHz)		826.4	836.4	846.6
3GPP Rel 99	AMR 12.2Kbps	23.01	23.04	23.50
3GPP Rel 99	RMC 12.2Kbps	23.04	23.06	23.53
3GPP Rel 6	HSDPA Subtest-1	22.71	22.64	23.16
3GPP Rel 6	HSDPA Subtest-2	22.67	22.61	23.10
3GPP Rel 6	HSDPA Subtest-3	22.26	22.21	22.69
3GPP Rel 6	HSDPA Subtest-4	22.17	22.25	22.71
3GPP Rel 8	DC-HSDPA Subtest-1	22.42	22.47	22.92
3GPP Rel 8	DC-HSDPA Subtest-2	22.50	22.51	22.94
3GPP Rel 8	DC-HSDPA Subtest-3	22.03	22.02	22.54
3GPP Rel 8	DC-HSDPA Subtest-4	21.94	21.92	22.46
3GPP Rel 6	HSUPA Subtest-1	22.65	22.63	23.12
3GPP Rel 6	HSUPA Subtest-2	21.59	21.71	22.08
3GPP Rel 6	HSUPA Subtest-3	21.81	21.84	22.31
3GPP Rel 6	HSUPA Subtest-4	21.58	21.55	22.12
3GPP Rel 6	HSUPA Subtest-5	22.46	22.42	22.89
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.93	20.99	21.42

WCDMA Band IV:

Band		WCDMA IV		
TX Channel		1312	1413	1513
Rx Channel		1537	1638	1738
Frequency (MHz)		1712.4	1732.6	1752.6
3GPP Rel 99	AMR 12.2Kbps	22.55	22.51	22.10
3GPP Rel 99	RMC 12.2Kbps	22.57	22.55	22.15
3GPP Rel 6	HSDPA Subtest-1	22.16	22.15	21.75
3GPP Rel 6	HSDPA Subtest-2	22.13	22.06	21.76
3GPP Rel 6	HSDPA Subtest-3	21.78	21.70	21.30
3GPP Rel 6	HSDPA Subtest-4	21.70	21.72	21.28
3GPP Rel 8	DC-HSDPA Subtest-1	21.97	21.96	21.55
3GPP Rel 8	DC-HSDPA Subtest-2	22.06	21.99	21.60
3GPP Rel 8	DC-HSDPA Subtest-3	21.56	21.54	21.13
3GPP Rel 8	DC-HSDPA Subtest-4	21.43	21.48	21.05
3GPP Rel 6	HSUPA Subtest-1	22.17	22.14	21.80
3GPP Rel 6	HSUPA Subtest-2	21.15	21.10	20.70
3GPP Rel 6	HSUPA Subtest-3	21.43	21.30	20.87
3GPP Rel 6	HSUPA Subtest-4	21.15	21.09	20.76
3GPP Rel 6	HSUPA Subtest-5	22.03	21.97	21.59
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.45	20.53	20.03

WCDMA Band II:

Band		WCDMA II		
TX Channel		9262	9400	9538
Rx Channel		9662	9800	9938
Frequency (MHz)		1852.4	1880	1907.6
3GPP Rel 99	AMR 12.2Kbps	22.62	22.21	22.30
3GPP Rel 99	RMC 12.2Kbps	22.65	22.24	22.31
3GPP Rel 6	HSDPA Subtest-1	22.25	21.84	21.96
3GPP Rel 6	HSDPA Subtest-2	22.20	21.79	21.84
3GPP Rel 6	HSDPA Subtest-3	21.83	21.44	21.53
3GPP Rel 6	HSDPA Subtest-4	21.83	21.41	21.47
3GPP Rel 8	DC-HSDPA Subtest-1	22.09	21.62	21.71
3GPP Rel 8	DC-HSDPA Subtest-2	22.10	21.69	21.75
3GPP Rel 8	DC-HSDPA Subtest-3	21.65	21.24	21.36
3GPP Rel 8	DC-HSDPA Subtest-4	21.56	21.09	21.18
3GPP Rel 6	HSUPA Subtest-1	22.27	21.80	21.87
3GPP Rel 6	HSUPA Subtest-2	21.26	20.85	20.94
3GPP Rel 6	HSUPA Subtest-3	21.43	21.02	21.07
3GPP Rel 6	HSUPA Subtest-4	21.13	20.77	20.81
3GPP Rel 6	HSUPA Subtest-5	22.09	21.65	21.73
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.56	20.18	20.22

For CDMA(Full Power):

CDMA BC0:

Band	CDMA2000 BC0		
TX Channel	1013	384	777
Frequency (MHz)	824.7	836.52	848.31
1xRTT RC1 SO55	24.12	24.10	23.94
1xRTT RC3 SO55	24.37	24.25	24.03
1xRTT RC3 SO32(+ F-SCH)	24.09	24.05	23.88
1xRTT RC3 SO32(+SCH)	24.30	24.24	23.99
1xEVDO RTAP 153.6Kbps	24.17	24.21	24.13
1xEVDO RETAP 4096Bits	24.16	24.15	24.06

CDMA BC1:

Band	CDMA2000 BC1		
TX Channel	25	600	1175
Frequency (MHz)	1851.25	1880	1908.75
1xRTT RC1 SO55	24.31	24.34	24.29
1xRTT RC3 SO55	24.35	24.31	24.30
1xRTT RC3 SO32(+ F-SCH)	24.28	24.25	24.20
1xRTT RC3 SO32(+SCH)	24.29	24.29	24.24
1xEVDO RTAP 153.6Kbps	24.28	24.26	24.13
1xEVDO RETAP 4096Bits	24.13	24.17	24.12

For LTE(Full Power):
LTE Band17:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd17	QPSK	5MHz	23755	706.5	RB1#0	22.72
					RB1#12	22.68
					RB1#24	22.52
					RB12#0	22
					RB12#11	22.06
					RB25#0	22.66
	16-QAM	5MHz	23755	706.5	RB1#0	22.83
					RB1#12	22.63
					RB1#24	22.06
					RB12#0	22.48
					RB12#11	22.69
					RB25#0	22.6
	QPSK	5MHz	23790	710	RB1#0	22.91
					RB1#12	22.62
					RB1#24	22.97
					RB12#0	22.85
					RB12#11	22.63
					RB25#0	22.95
	16-QAM	5MHz	23790	710	RB1#0	22.84
					RB1#12	22.6
					RB1#24	22.68
					RB12#0	22.58
					RB12#11	22.13
					RB25#0	22.87
	QPSK	5MHz	23825	713.5	RB1#0	22.73
					RB1#12	22.62
					RB1#24	22.66
					RB12#0	22.68
					RB12#11	22.42
					RB25#0	22.67
	16-QAM	5MHz	23825	713.5	RB1#0	22.37
					RB1#12	22.15
					RB1#24	22.33

					RB12#0	22.06
					RB12#11	22.06
					RB25#0	22.66

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd17	QPSK	10MHz	23780	709	RB1#0	22.88
					RB1#24	22.16
					RB1#49	22.85
					RB25#0	22.5
					RB25#24	22.43
					RB50#0	22.42
	16-QAM	10MHz	23780	709	RB1#0	22.26
					RB1#24	22.16
					RB1#49	22.06
					RB25#0	22.26
					RB25#24	22.05
					RB50#0	22.67
	QPSK	10MHz	23790	710	RB1#0	22.15
					RB1#24	22.82
					RB1#49	22.85
					RB25#0	22.61
					RB25#24	22.63
					RB50#0	22.62
	16-QAM	10MHz	23790	710	RB1#0	22.46
					RB1#24	22.16
					RB1#49	22.56
					RB25#0	22.48
					RB25#24	22.16
					RB50#0	22.16
	QPSK	10MHz	23800	711	RB1#0	22.42
					RB1#24	22.58
					RB1#49	22.59
					RB25#0	22.58
					RB25#24	22.69
					RB50#0	22.36
	16-QAM	10MHz	23800	711	RB1#0	22.54

					RB1#24	22.16
					RB1#49	22.36
					RB25#0	22.42
					RB25#24	22.06
					RB50#0	22.13

LTE Band13:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd13	QPSK	5MHz	23205	779.5	RB1#0	23
					RB1#12	22.15
					RB1#24	22.79
					RB12#0	22.63
					RB12#11	22.45
					RB25#0	22.61
	16-QAM	5MHz	23205	779.5	RB1#0	22.91
					RB1#12	22.15
					RB1#24	22.76
					RB12#0	22.56
					RB12#11	22.45
					RB25#0	22.58
	QPSK	5MHz	23230	782	RB1#0	22.7
					RB1#12	22.63
					RB1#24	22.7
					RB12#0	22.66
					RB12#11	22.54
					RB25#0	22.76
	16-QAM	5MHz	23230	782	RB1#0	22.5
					RB1#12	22.52
					RB1#24	22.7
					RB12#0	22.64
					RB12#11	22.6
					RB25#0	22.66
	QPSK	5MHz	23255	784.5	RB1#0	22.86
					RB1#12	22.52
					RB1#24	22.83
					RB12#0	22.26

					RB12#11	22.15
					RB25#0	22.65
	16-QAM	5MHz	23255	784.5	RB1#0	22.08
					RB1#12	22.03
					RB1#24	22.04
					RB12#0	22.53
					RB12#11	22.45
					RB25#0	22.59

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd13	QPSK	10MHz	23230	782	RB1#0	22.66
					RB1#24	22.35
					RB1#49	22.73
					RB25#0	22.15
					RB25#24	22.95
					RB50#0	22.61
	16-QAM	10MHz	23230	782	RB1#0	22.51
					RB1#24	22.26
					RB1#49	22.5
					RB25#0	22.21
					RB25#24	22.06
					RB50#0	22.53

LTE Band5：

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd5	QPSK	5MHz	20425	826.5	RB1#0	22.7
					RB1#12	22.56
					RB1#24	22.73
					RB12#0	22.15
					RB12#11	22.36
					RB25#0	22.61
	16-QAM	5MHz	20425	826.5	RB1#0	22.7
					RB1#12	22.36
					RB1#24	22.69
					RB12#0	22.3

					RB12#11	22.56
					RB25#0	22.53
	QPSK	5MHz	20525	836.5	RB1#0	22.81
					RB1#12	22.12
					RB1#24	22.74
					RB12#0	22.23
					RB12#11	22.52
					RB25#0	22.53
	16-QAM	5MHz	20525	836.5	RB1#0	22.63
					RB1#12	22.58
					RB1#24	22.52
					RB12#0	22.25
					RB12#11	22.36
					RB25#0	22.27
	QPSK	5MHz	20625	846.5	RB1#0	22.94
					RB1#12	22.58
					RB1#24	22.71
					RB12#0	22.14
					RB12#11	22.54
					RB25#0	22.68
	16-QAM	5MHz	20625	846.5	RB1#0	22.4
					RB1#12	22.45
					RB1#24	22.19
					RB12#0	22.56
					RB12#11	22.56
					RB25#0	22.58

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd5	QPSK	10MHz	20450	829	RB1#0	22.66
					RB1#24	22.53
					RB1#49	22.73
					RB25#0	22.15
					RB25#24	22.16
					RB50#0	22.61
	16-QAM	10MHz	20450	829	RB1#0	22.51
					RB1#24	22.15

					RB1#49	22.5
					RB25#0	22.15
					RB25#24	22.06
					RB50#0	22.53
	QPSK	10MHz	20525	836.5	RB1#0	22.65
					RB1#24	22.35
					RB1#49	22.91
					RB25#0	22.15
					RB25#24	22.62
					RB50#0	22.64
	16-QAM	10MHz	20525	836.5	RB1#0	22.04
					RB1#24	22.15
					RB1#49	22.08
					RB25#0	22.64
					RB25#24	22.63
					RB50#0	22.72
	QPSK	10MHz	20600	844	RB1#0	22.78
					RB1#24	22.89
					RB1#49	22.64
					RB25#0	22.69
					RB25#24	22.47
					RB50#0	22.61
	16-QAM	10MHz	20600	844	RB1#0	22.8
					RB1#24	22.06
					RB1#49	22.64
					RB25#0	22.63
					RB25#24	22.02
					RB50#0	22.56

LTE Band4：

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd4	QPSK	5MHz	19975	1712.5	RB1#0	23.36
					RB1#12	23.3
					RB1#24	23.24
					RB12#0	23.01
					RB12#11	22.58

					RB25#0	22.27
	16-QAM	5MHz	19975	1712.5	RB1#0	22.33
					RB1#12	22.16
					RB1#24	22.3
					RB12#0	22.15
					RB12#11	22.05
					RB25#0	22.15
	QPSK	5MHz	20175	1732.5	RB1#0	23.28
					RB1#12	23.12
					RB1#24	23.35
					RB12#0	22.93
					RB12#11	22.82
					RB25#0	22.68
	16-QAM	5MHz	20175	1732.5	RB1#0	22.04
					RB1#12	22.01
					RB1#24	22.1
					RB12#0	22.15
					RB12#11	22.18
					RB25#0	22.3
	QPSK	5MHz	20375	1752.5	RB1#0	23.39
					RB1#12	23.15
					RB1#24	23.4
					RB12#0	22.96
					RB12#11	22.58
					RB25#0	22.45
	16-QAM	5MHz	20375	1752.5	RB1#0	22.74
					RB1#12	22.6
					RB1#24	22.56
					RB12#0	22.48
					RB12#11	22.69
					RB25#0	22.17

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd4	QPSK	10MHz	20000	1715	RB1#0	23.2
					RB1#24	22.86
					RB1#49	23.36

					RB25#0	22.75
					RB25#24	22.69
					RB50#0	22.94
	16-QAM	10MHz	20000	1715	RB1#0	22.36
					RB1#24	22.3
					RB1#49	22.03
					RB25#0	22.2
					RB25#24	22.14
					RB50#0	22.25
	QPSK	10MHz	20175	1732.5	RB1#0	23.26
					RB1#24	23.19
					RB1#49	23.12
					RB25#0	23.48
					RB25#24	22.86
					RB50#0	22.98
	16-QAM	10MHz	20175	1732.5	RB1#0	22.41
					RB1#24	22.13
					RB1#49	22.46
					RB25#0	22.18
					RB25#24	22.16
					RB50#0	22.4
	QPSK	10MHz	20350	1750	RB1#0	23.26
					RB1#24	22.96
					RB1#49	22.56
					RB25#0	23.21
					RB25#24	22.41
					RB50#0	22.21
	16-QAM	10MHz	20350	1750	RB1#0	22.35
					RB1#24	22.05
					RB1#49	22.28
					RB25#0	22.13
					RB25#24	22.31
					RB50#0	22.36

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE	QPSK	15MHz	20025	1717.5	RB1#0	23.21

Babd4					RB1#37	23.05
					RB1#74	23.17
					RB36#0	22.14
					RB36#37	22.42
					RB75#0	22.3
	16-QAM	15MHz	20025	1717.5	RB1#0	22.19
					RB1#37	22.62
					RB1#74	22.2
					RB36#0	22.16
					RB36#37	22.14
					RB75#0	22.15
	QPSK	15MHz	20175	1732.5	RB1#0	23.18
					RB1#37	23.12
					RB1#74	23.34
					RB36#0	22.63
					RB36#37	22.16
					RB75#0	22.94
	16-QAM	15MHz	20175	1732.5	RB1#0	22.36
					RB1#37	22.41
					RB1#74	22.57
					RB36#0	22.1
					RB36#37	22.16
					RB75#0	22.14
	QPSK	15MHz	20325	1747.5	RB1#0	23.39
					RB1#37	23.36
					RB1#74	23.29
					RB36#0	22.69
					RB36#37	22.56
					RB75#0	23.14
	16-QAM	15MHz	20325	1747.5	RB1#0	22.29
					RB1#37	22.4
					RB1#74	22.2
					RB36#0	22.02
					RB36#37	22.46
					RB75#0	22.16

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency	Test RB	Measured

				(MHz)		[dBm]
LTE Babd4	QPSK	20MHz	20050	1720	RB1#0	23.22
					RB1#49	23.15
					RB1#99	23.3
					RB50#0	23.26
					RB50#49	23.18
					RB100#0	23.14
	16-QAM	20MHz	20050	1720	RB1#0	22.36
					RB1#49	22.2
					RB1#99	22.15
					RB50#0	22.19
					RB50#49	22.14
					RB100#0	22.36
	QPSK	20MHz	20175	1732.5	RB1#0	23.03
					RB1#49	22.96
					RB1#99	23.24
					RB50#0	23.02
					RB50#49	22.65
					RB100#0	22.45
	16-QAM	20MHz	20175	1732.5	RB1#0	22.12
					RB1#49	22.18
					RB1#99	22.41
					RB50#0	22.25
					RB50#49	22.3
					RB100#0	22.25
	QPSK	20MHz	20300	1745	RB1#0	23.29
					RB1#49	23.2
					RB1#99	23.18
					RB50#0	23.05
					RB50#49	23.14
					RB100#0	23.1
	16-QAM	20MHz	20300	1745	RB1#0	22.31
					RB1#49	22.36
					RB1#99	22.32
					RB50#0	22.05
					RB50#49	22.45
					RB100#0	22.14

LTE Band2:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	5MHz	18625	1852.5	RB1#0	23.19
					RB1#12	23.2
					RB1#24	23.25
					RB12#0	23
					RB12#11	22.95
					RB25#0	22.01
	16-QAM	5MHz	18625	1852.5	RB1#0	22.01
					RB1#12	22.01
					RB1#24	22.13
					RB12#0	22.2
					RB12#11	22.16
					RB25#0	22.18
	QPSK	5MHz	18900	1880	RB1#0	23.17
					RB1#12	22.82
					RB1#24	22.99
					RB12#0	22.45
					RB12#11	22.3
					RB25#0	22.05
	16-QAM	5MHz	18900	1880	RB1#0	22.36
					RB1#12	22.05
					RB1#24	22.08
					RB12#0	22.35
					RB12#11	22.3
					RB25#0	22.31
	QPSK	5MHz	19175	1907.5	RB1#0	23.06
					RB1#12	22.14
					RB1#24	23.21
					RB12#0	22.01
					RB12#11	22.25
					RB25#0	22.97
	16-QAM	5MHz	19175	1907.5	RB1#0	22.14
					RB1#12	22.1
					RB1#24	22.15

					RB12#0	22.2
					RB12#11	22.3
					RB25#0	22.02

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	10MHz	18650	1855	RB1#0	23.23
					RB1#24	23.15
					RB1#49	23.36
					RB25#0	22.85
					RB25#24	22.46
					RB50#0	22.97
	16-QAM	10MHz	18650	1855	RB1#0	22.93
					RB1#24	22.41
					RB1#49	23.08
					RB25#0	23.58
					RB25#24	23.41
					RB50#0	23
	QPSK	10MHz	18900	1880	RB1#0	23.19
					RB1#24	23.01
					RB1#49	23.12
					RB25#0	22.8
					RB25#24	23.19
					RB50#0	22.95
	16-QAM	10MHz	18900	1880	RB1#0	22.58
					RB1#24	22.13
					RB1#49	22.49
					RB25#0	22.5
					RB25#24	22.2
					RB50#0	22.13
	QPSK	10MHz	19150	1905	RB1#0	23.12
					RB1#24	23.18
					RB1#49	23.38
					RB25#0	23.42
					RB25#24	22.41
					RB50#0	22.96
	16-QAM	10MHz	19150	1905	RB1#0	22.04

					RB1#24	22.09
					RB1#49	22.31
					RB25#0	22.26
					RB25#24	22.14
					RB50#0	22.25

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	15MHz	18675	1857.5	RB1#0	23.22
					RB1#37	22.95
					RB1#74	23.4
					RB36#0	22.41
					RB36#37	22.9
					RB75#0	22.96
	16-QAM	15MHz	18675	1857.5	RB1#0	22.04
					RB1#37	22.14
					RB1#74	22.33
					RB36#0	22.38
					RB36#37	22.42
					RB75#0	22.19
	QPSK	15MHz	18900	1880	RB1#0	23.18
					RB1#37	22.86
					RB1#74	23.2
					RB36#0	22.42
					RB36#37	22.16
					RB75#0	22.09
	16-QAM	15MHz	18900	1880	RB1#0	22.52
					RB1#37	22.5
					RB1#74	22.42
					RB36#0	22.41
					RB36#37	22.36
					RB75#0	22.15
	QPSK	15MHz	19125	1902.5	RB1#0	23.19
					RB1#37	23
					RB1#74	23.35
					RB36#0	22.42
					RB36#37	22.36

					RB75#0	22.89
	16-QAM	15MHz	19125	1902.5	RB1#0	22.18
					RB1#37	22.15
					RB1#74	22.18
					RB36#0	22.1
					RB36#37	22.26
					RB75#0	22.31

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	20MHz	18700	1860	RB1#0	23.2
					RB1#49	23.18
					RB1#99	23.15
					RB50#0	22.65
					RB50#49	23.12
					RB100#0	23.04
	16-QAM	20MHz	18700	1860	RB1#0	22.47
					RB1#49	22.35
					RB1#99	22.15
					RB50#0	22.53
					RB50#49	22.8
					RB100#0	22.97
	QPSK	20MHz	18900	1880	RB1#0	23.27
					RB1#49	22.96
					RB1#99	23.2
					RB50#0	22.58
					RB50#49	23.15
					RB100#0	23.18
	16-QAM	20MHz	18900	1880	RB1#0	23.27
					RB1#49	23.26
					RB1#99	23.02
					RB50#0	23.15
					RB50#49	23.16
					RB100#0	23.18
	QPSK	20MHz	19100	1900	RB1#0	23.47
					RB1#49	23.02
					RB1#99	23.72

					RB50#0	23.03
					RB50#49	23.52
					RB100#0	23.14
	16-QAM	20MHz	19100	1900	RB1#0	23.22
					RB1#49	23.05
					RB1#99	23.46
					RB50#0	22.95
					RB50#49	22.9
					RB100#0	22.96

LTE Band25:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	5MHz	26065	1852.5	RB1#0	23.35
					RB1#12	23.23
					RB1#24	23.48
					RB12#0	23.13
					RB12#11	23.42
					RB25#0	22.19
	16-QAM	5MHz	26065	1852.5	RB1#0	22.36
					RB1#12	22.62
					RB1#24	22.41
					RB12#0	22.42
					RB12#11	22.3
					RB25#0	22.19
	QPSK	5MHz	26365	1882.5	RB1#0	23.23
					RB1#12	22.36
					RB1#24	23.26
					RB12#0	23.3
					RB12#11	22.2
					RB25#0	22.25
	16-QAM	5MHz	26365	1882.5	RB1#0	22.09
					RB1#12	22.03
					RB1#24	22.09
					RB12#0	22
					RB12#11	22.96
					RB25#0	22.24

	QPSK	5MHz	26665	1912.5	RB1#0	23.4
					RB1#12	23.05
					RB1#24	23.45
					RB12#0	23.14
					RB12#11	23.1
					RB25#0	22.36
	16-QAM	5MHz	26665	1912.5	RB1#0	22.47
					RB1#12	22.06
					RB1#24	22.68
					RB12#0	22.52
					RB12#11	22.16
					RB25#0	22.11

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	10MHz	26090	1855	RB1#0	23.41
					RB1#24	22.85
					RB1#49	23.38
					RB25#0	22.86
					RB25#24	22.35
					RB50#0	22.13
	16-QAM	10MHz	26090	1855	RB1#0	22.14
					RB1#24	22.14
					RB1#49	22.18
					RB25#0	22.05
					RB25#24	22.03
					RB50#0	22.14
	QPSK	10MHz	26365	1882.5	RB1#0	23.28
					RB1#24	22.96
					RB1#49	23.2
					RB25#0	23.1
					RB25#24	22.85
					RB50#0	22.28
	16-QAM	10MHz	26365	1882.5	RB1#0	22.64
					RB1#24	22.56
					RB1#49	22.53
					RB25#0	22.16

					RB25#24	22.13
					RB50#0	22.09
	QPSK	10MHz	26640	1910	RB1#0	23.41
					RB1#24	22.63
					RB1#49	23.39
					RB25#0	22.52
					RB25#24	22.35
					RB50#0	22.19
	16-QAM	10MHz	26640	1910	RB1#0	22.25
					RB1#24	22
					RB1#49	22.32
					RB25#0	22.3
					RB25#24	22.02
					RB50#0	22.09

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	15MHz	26115	1857.5	RB1#0	23.2
					RB1#37	23.32
					RB1#74	23.02
					RB36#0	23.15
					RB36#37	23.28
					RB75#0	22.65
	16-QAM	15MHz	26115	1857.5	RB1#0	22.56
					RB1#37	22.63
					RB1#74	22.35
					RB36#0	22.17
					RB36#37	22.1
					RB75#0	22.95
	QPSK	15MHz	26365	1882.5	RB1#0	22.3
					RB1#37	22.93
					RB1#74	23.32
					RB36#0	22.85
					RB36#37	23.28
					RB75#0	22.16
	16-QAM	15MHz	26365	1882.5	RB1#0	22.17
					RB1#37	22.1

					RB1#74	22.3
					RB36#0	22.16
					RB36#37	22.15
					RB75#0	22.42
	QPSK	15MHz	26615	1907.5	RB1#0	22.19
					RB1#37	22.52
					RB1#74	22.63
					RB36#0	22.45
					RB36#37	22.58
					RB75#0	22.15
	16-QAM	15MHz	26615	1907.5	RB1#0	22.32
					RB1#37	22.52
					RB1#74	22.42
					RB36#0	22.36
					RB36#37	22.42
					RB75#0	22.06

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	20MHz	26140	1860	RB1#0	23.39
					RB1#49	23.25
					RB1#99	23.25
					RB50#0	23.02
					RB50#49	22.69
					RB100#0	22.11
	16-QAM	20MHz	26140	1860	RB1#0	22.09
					RB1#49	22.02
					RB1#99	22.09
					RB50#0	22
					RB50#49	22.96
					RB100#0	22.19
	QPSK	20MHz	26365	1882.5	RB1#0	23.36
					RB1#49	23.02
					RB1#99	23.23
					RB50#0	22.52
					RB50#49	22.42
					RB100#0	22.06

	16-QAM	20MHz	26365	1882.5	RB1#0	22.51
					RB1#49	22.03
					RB1#99	22.29
					RB50#0	22.1
					RB50#49	22.06
					RB100#0	22.09
	QPSK	20MHz	26590	1905	RB1#0	23.25
					RB1#49	22.15
					RB1#99	23.35
					RB50#0	22.43
					RB50#49	22.63
					RB100#0	22.14
	16-QAM	20MHz	26590	1905	RB1#0	22.2
					RB1#49	22.68
					RB1#99	22.27
					RB50#0	22.06
					RB50#49	22.1
					RB100#0	22.18

For GSM(Reduced Power):

Burst Average Power test result as bellowing:

Band	GSM850			PCS1900		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880	1909.8
GPRS Multi-Slot Class8 (1 Uplink)	29.89	30.31	30.26	26.47	26.61	26.67
GPRS Multi-Slot Class10 (2 Uplink)	29.87	30.03	30.08	26.40	26.34	26.49
EDGE Multi-Slot Class8 (1 Uplink)	25.54	25.59	25.64	21.98	22.28	22.40
EDGE Multi-Slot Class10 (2 Uplink)	25.26	25.32	25.45	21.93	22.19	22.30
EDGE Multi-Slot Class11 (3 Uplink)	25.06	25.21	25.22	21.80	22.09	22.15
EDGE Multi-Slot Class12 (4 Uplink)	24.90	24.86	24.96	21.63	21.92	22.01
Note: GPRS, CS1 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link EDGE, MCS5 coding scheme. Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 6 working link Multi-Slot Class 11 , Support Max 4 downlink, 3 uplink , 7 working link Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 8 working link						

Source-based Time Averaged Burst Power as bellowing:

Band	GSM850				PCS1900			
Channel	128	189	251	Time average factor	512	661	810	Time average factor
Frequency(MHz)	824.2	836.4	848.8		1850.2	1880	1909.8	
GPRS Multi-Slot Class8 (1 Uplink)	20.89	21.31	21.26	-9.03	17.47	17.61	17.67	-9.03
GPRS Multi-Slot Class10 (2 Uplink)	23.87	24.03	24.08	-6.02	20.40	20.34	20.49	-6.02
EDGE Multi-Slot Class8 (1 Uplink)	16.54	16.59	16.64	-9.03	12.98	13.28	13.40	-9.03
EDGE Multi-Slot Class10 (2 Uplink)	19.26	19.32	19.45	-6.02	15.93	16.19	16.30	-6.02
EDGE Multi-Slot Class11 (3 Uplink)	20.80	20.95	20.96	-4.26	17.54	17.83	17.89	-4.26

EDGE Multi-Slot Class12 (4 Uplink)	21.90	21.86	21.96	-3.01	18.63	18.92	19.01	-3.01

Note: 1 uplink , Time average factor =10*log(1/8)=-9.03dB,
2 uplink , Time average factor =10*log(2/8)=-6.02dB,
3 uplink, Time average factor =10*log(3/8)=-4.26dB,
4 uplink, Time average factor =10*log(4/8)=-3.01dB,
Source based time average power = Burst Average power + Time Average factor

For WCDMA(Reduced Power):

WCDMA Band V:

Band		WCDMA V		
TX Channel		4132	4182	4233
Rx Channel		4357	4407	4458
Frequency (MHz)		826.4	836.4	846.6
3GPP Rel 99	AMR 12.2Kbps	19.97	20.02	20.43
3GPP Rel 99	RMC 12.2Kbps	20.02	20.03	20.50
3GPP Rel 6	HSDPA Subtest-1	19.67	19.62	20.21
3GPP Rel 6	HSDPA Subtest-2	19.64	19.57	20.12
3GPP Rel 6	HSDPA Subtest-3	19.24	19.24	19.72
3GPP Rel 6	HSDPA Subtest-4	19.14	19.24	19.62
3GPP Rel 8	DC-HSDPA Subtest-1	19.38	19.43	19.89
3GPP Rel 8	DC-HSDPA Subtest-2	19.49	19.52	19.93
3GPP Rel 8	DC-HSDPA Subtest-3	19.00	18.97	19.48
3GPP Rel 8	DC-HSDPA Subtest-4	18.87	18.91	19.42
3GPP Rel 6	HSUPA Subtest-1	19.64	19.59	20.06
3GPP Rel 6	HSUPA Subtest-2	18.59	18.68	19.02
3GPP Rel 6	HSUPA Subtest-3	18.80	18.86	19.29
3GPP Rel 6	HSUPA Subtest-4	18.56	18.56	19.09
3GPP Rel 6	HSUPA Subtest-5	19.43	19.35	19.92
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	17.94	17.95	18.39

WCDMA Band IV:

Band		WCDMA IV		
TX Channel		1312	1413	1513
Rx Channel		1537	1638	1738
Frequency (MHz)		1712.4	1732.6	1752.6
3GPP Rel 99	AMR 12.2Kbps	19.47	19.48	19.13
3GPP Rel 99	RMC 12.2Kbps	19.56	19.53	19.17
3GPP Rel 6	HSDPA Subtest-1	19.13	19.06	18.76
3GPP Rel 6	HSDPA Subtest-2	19.06	19.00	18.75
3GPP Rel 6	HSDPA Subtest-3	18.79	18.68	18.35
3GPP Rel 6	HSDPA Subtest-4	18.64	18.69	18.26
3GPP Rel 8	DC-HSDPA Subtest-1	18.90	18.93	18.46
3GPP Rel 8	DC-HSDPA Subtest-2	19.03	18.93	18.58
3GPP Rel 8	DC-HSDPA Subtest-3	18.61	18.52	18.12
3GPP Rel 8	DC-HSDPA Subtest-4	18.45	18.49	18.01
3GPP Rel 6	HSUPA Subtest-1	19.14	19.13	18.77
3GPP Rel 6	HSUPA Subtest-2	18.06	18.02	17.66
3GPP Rel 6	HSUPA Subtest-3	18.43	18.29	17.87
3GPP Rel 6	HSUPA Subtest-4	18.14	18.06	17.77
3GPP Rel 6	HSUPA Subtest-5	19.00	18.90	18.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	17.39	17.52	16.99

WCDMA Band II:

Band		WCDMA II		
TX Channel		9262	9400	9538
Rx Channel		9662	9800	9938
Frequency (MHz)		1852.4	1880	1907.6
3GPP Rel 99	AMR 12.2Kbps	19.53	19.12	19.31
3GPP Rel 99	RMC 12.2Kbps	19.63	19.18	19.30
3GPP Rel 6	HSDPA Subtest-1	19.24	18.82	19.01
3GPP Rel 6	HSDPA Subtest-2	19.16	18.76	18.82
3GPP Rel 6	HSDPA Subtest-3	18.80	18.40	18.50
3GPP Rel 6	HSDPA Subtest-4	18.88	18.43	18.48
3GPP Rel 8	DC-HSDPA Subtest-1	19.08	18.67	18.65
3GPP Rel 8	DC-HSDPA Subtest-2	19.03	18.62	18.77
3GPP Rel 8	DC-HSDPA Subtest-3	18.59	18.15	18.28
3GPP Rel 8	DC-HSDPA Subtest-4	18.57	18.07	18.17
3GPP Rel 6	HSUPA Subtest-1	19.24	18.75	18.85
3GPP Rel 6	HSUPA Subtest-2	18.22	17.83	17.91
3GPP Rel 6	HSUPA Subtest-3	18.37	18.05	18.06
3GPP Rel 6	HSUPA Subtest-4	18.10	17.79	17.74
3GPP Rel 6	HSUPA Subtest-5	19.01	18.64	18.75
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	17.59	17.15	17.22

For CDMA(Reduced Power):

CDMA BC0:

Band	CDMA2000 BC0		
TX Channel	1013	384	777
Frequency (MHz)	824.7	836.52	848.31
1xRTT RC1 SO55	22.09	22.07	21.97
1xRTT RC3 SO55	22.30	22.28	22.05
1xRTT RC3 SO32(+ F-SCH)	22.00	21.96	21.89
1xRTT RC3 SO32(+SCH)	22.28	22.18	21.98
1xEVDO RTAP 153.6Kbps	22.16	22.19	22.18
1xEVDO RETAP 4096Bits	22.12	22.10	22.04

CDMA BC1:

Band	CDMA2000 BC1		
TX Channel	25	600	1175
Frequency (MHz)	1851.25	1880	1908.75
1xRTT RC1 SO55	22.24	22.36	22.25
1xRTT RC3 SO55	22.26	22.23	22.32
1xRTT RC3 SO32(+ F-SCH)	22.26	22.24	22.18
1xRTT RC3 SO32(+SCH)	22.24	22.26	22.21
1xEVDO RTAP 153.6Kbps	22.27	22.24	22.14
1xEVDO RETAP 4096Bits	22.18	22.19	22.13

For LTE(Reduced Power):
LTE Band17:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd17	QPSK	5MHz	23755	706.5	RB1#0	20.7
					RB1#12	20.64
					RB1#24	20.49
					RB12#0	19.98
					RB12#11	20.03
					RB25#0	20.62
	16-QAM	5MHz	23755	706.5	RB1#0	20.82
					RB1#12	20.6
					RB1#24	20.03
					RB12#0	20.44
					RB12#11	20.67
					RB25#0	20.56
	QPSK	5MHz	23790	710	RB1#0	20.88
					RB1#12	20.6
					RB1#24	20.94
					RB12#0	20.81
					RB12#11	20.62
					RB25#0	20.92
	16-QAM	5MHz	23790	710	RB1#0	20.85
					RB1#12	20.51
					RB1#24	20.64
					RB12#0	20.52
					RB12#11	20.1
					RB25#0	20.79
	QPSK	5MHz	23825	713.5	RB1#0	20.76
					RB1#12	20.64
					RB1#24	20.67
					RB12#0	20.67
					RB12#11	20.47
					RB25#0	20.65
	16-QAM	5MHz	23825	713.5	RB1#0	20.34
					RB1#12	20.16
					RB1#24	20.27

					RB12#0	20.08
					RB12#11	19.98
					RB25#0	20.64

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd17	QPSK	10MHz	23780	709	RB1#0	20.9
					RB1#24	20.11
					RB1#49	20.83
					RB25#0	20.47
					RB25#24	20.41
					RB50#0	20.38
	16-QAM	10MHz	23780	709	RB1#0	20.29
					RB1#24	20.15
					RB1#49	20.02
					RB25#0	20.27
					RB25#24	20.07
					RB50#0	20.64
	QPSK	10MHz	23790	710	RB1#0	20.13
					RB1#24	20.85
					RB1#49	20.87
					RB25#0	20.6
					RB25#24	20.6
					RB50#0	20.54
	16-QAM	10MHz	23790	710	RB1#0	20.45
					RB1#24	20.12
					RB1#49	20.5
					RB25#0	20.49
					RB25#24	20.09
					RB50#0	20.12
	QPSK	10MHz	23800	711	RB1#0	20.39
					RB1#24	20.54
					RB1#49	20.61
					RB25#0	20.56
					RB25#24	20.65
					RB50#0	20.33
	16-QAM	10MHz	23800	711	RB1#0	20.52

					RB1#24	20.13
					RB1#49	20.32
					RB25#0	20.41
					RB25#24	20.03
					RB50#0	20.1

LTE Band13:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd13	QPSK	5MHz	23205	779.5	RB1#0	21.01
					RB1#12	20.15
					RB1#24	20.81
					RB12#0	20.63
					RB12#11	20.46
					RB25#0	20.63
	16-QAM	5MHz	23205	779.5	RB1#0	20.92
					RB1#12	20.15
					RB1#24	20.79
					RB12#0	20.57
					RB12#11	20.46
					RB25#0	20.58
	QPSK	5MHz	23230	782	RB1#0	20.72
					RB1#12	20.63
					RB1#24	20.71
					RB12#0	20.68
					RB12#11	20.55
					RB25#0	20.76
	16-QAM	5MHz	23230	782	RB1#0	20.53
					RB1#12	20.53
					RB1#24	20.67
					RB12#0	20.67
					RB12#11	20.55
					RB25#0	20.66
	QPSK	5MHz	23255	784.5	RB1#0	20.84
					RB1#12	20.53
					RB1#24	20.79
					RB12#0	20.33

					RB12#11	20.21
					RB25#0	20.7
	16-QAM	5MHz	23255	784.5	RB1#0	20.11
					RB1#12	20.12
					RB1#24	20.06
					RB12#0	20.54
					RB12#11	20.5
					RB25#0	20.57

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd13	QPSK	10MHz	23230	782	RB1#0	20.67
					RB1#24	20.37
					RB1#49	20.76
					RB25#0	20.17
					RB25#24	20.93
					RB50#0	20.62
	16-QAM	10MHz	23230	782	RB1#0	20.51
					RB1#24	20.32
					RB1#49	20.49
					RB25#0	20.23
					RB25#24	20.07
					RB50#0	20.55

LTE Band5:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd5	QPSK	5MHz	20425	826.5	RB1#0	20.69
					RB1#12	20.49
					RB1#24	20.7
					RB12#0	20.18
					RB12#11	20.27
					RB25#0	20.55
	16-QAM	5MHz	20425	826.5	RB1#0	20.68
					RB1#12	20.33
					RB1#24	20.65
					RB12#0	20.32

					RB12#11	20.61
					RB25#0	20.46
	QPSK	5MHz	20525	836.5	RB1#0	20.72
					RB1#12	20.1
					RB1#24	20.69
					RB12#0	20.22
					RB12#11	20.49
					RB25#0	20.51
	16-QAM	5MHz	20525	836.5	RB1#0	20.62
					RB1#12	20.56
					RB1#24	20.46
					RB12#0	20.22
					RB12#11	20.32
					RB25#0	20.29
	QPSK	5MHz	20625	846.5	RB1#0	20.89
					RB1#12	20.56
					RB1#24	20.68
					RB12#0	20.12
					RB12#11	20.5
					RB25#0	20.71
	16-QAM	5MHz	20625	846.5	RB1#0	20.39
					RB1#12	20.41
					RB1#24	20.2
					RB12#0	20.51
					RB12#11	20.55
					RB25#0	20.54

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd5	QPSK	10MHz	20450	829	RB1#0	20.63
					RB1#24	20.51
					RB1#49	20.7
					RB25#0	20.11
					RB25#24	20.15
					RB50#0	20.58
	16-QAM	10MHz	20450	829	RB1#0	20.48
					RB1#24	20.11

					RB1#49	20.48
					RB25#0	20.11
					RB25#24	20.03
					RB50#0	20.51
	QPSK	10MHz	20525	836.5	RB1#0	20.62
					RB1#24	20.31
					RB1#49	20.9
					RB25#0	20.12
					RB25#24	20.55
					RB50#0	20.63
	16-QAM	10MHz	20525	836.5	RB1#0	20.01
					RB1#24	20.09
					RB1#49	20.06
					RB25#0	20.61
					RB25#24	20.66
					RB50#0	20.69
	QPSK	10MHz	20600	844	RB1#0	20.71
					RB1#24	20.8
					RB1#49	20.62
					RB25#0	20.68
					RB25#24	20.43
					RB50#0	20.58
	16-QAM	10MHz	20600	844	RB1#0	20.85
					RB1#24	20.05
					RB1#49	20.57
					RB25#0	20.57
					RB25#24	19.99
					RB50#0	20.52

LTE Band4:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd4	QPSK	5MHz	19975	1712.5	RB1#0	21.42
					RB1#12	21.31
					RB1#24	21.26
					RB12#0	21.08
					RB12#11	20.64

					RB25#0	20.3
	16-QAM	5MHz	19975	1712.5	RB1#0	20.34
					RB1#12	20.12
					RB1#24	20.33
					RB12#0	20.15
					RB12#11	20.03
					RB25#0	20.2
	QPSK	5MHz	20175	1732.5	RB1#0	21.25
					RB1#12	21.12
					RB1#24	21.36
					RB12#0	20.93
					RB12#11	20.88
					RB25#0	20.7
	16-QAM	5MHz	20175	1732.5	RB1#0	20.06
					RB1#12	20.01
					RB1#24	20.11
					RB12#0	20.17
					RB12#11	20.19
					RB25#0	20.3
	QPSK	5MHz	20375	1752.5	RB1#0	21.42
					RB1#12	21.16
					RB1#24	21.41
					RB12#0	20.96
					RB12#11	20.6
					RB25#0	20.45
	16-QAM	5MHz	20375	1752.5	RB1#0	20.75
					RB1#12	20.62
					RB1#24	20.57
					RB12#0	20.48
					RB12#11	20.72
					RB25#0	20.18

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd4	QPSK	10MHz	20000	1715	RB1#0	21.22
					RB1#24	20.87
					RB1#49	21.43

					RB25#0	20.76
					RB25#24	20.66
					RB50#0	20.89
	16-QAM	10MHz	20000	1715	RB1#0	20.38
					RB1#24	20.33
					RB1#49	20.03
					RB25#0	20.21
					RB25#24	20.23
					RB50#0	20.28
	QPSK	10MHz	20175	1732.5	RB1#0	21.23
					RB1#24	21.17
					RB1#49	21.17
					RB25#0	21.49
					RB25#24	20.86
					RB50#0	21
	16-QAM	10MHz	20175	1732.5	RB1#0	20.41
					RB1#24	20.14
					RB1#49	20.48
					RB25#0	20.19
					RB25#24	20.16
					RB50#0	20.43
	QPSK	10MHz	20350	1750	RB1#0	21.27
					RB1#24	20.97
					RB1#49	20.56
					RB25#0	21.23
					RB25#24	20.41
					RB50#0	20.22
	16-QAM	10MHz	20350	1750	RB1#0	20.37
					RB1#24	20.06
					RB1#49	20.28
					RB25#0	20.16
					RB25#24	20.32
					RB50#0	20.41

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE	QPSK	15MHz	20025	1717.5	RB1#0	21.22

Babd4					RB1#37	21.01
					RB1#74	21.24
					RB36#0	20.2
					RB36#37	20.47
					RB75#0	20.33
	16-QAM	15MHz	20025	1717.5	RB1#0	20.28
					RB1#37	20.64
					RB1#74	20.21
					RB36#0	20.21
					RB36#37	20.12
					RB75#0	20.21
	QPSK	15MHz	20175	1732.5	RB1#0	21.14
					RB1#37	21.15
					RB1#74	21.34
					RB36#0	20.65
					RB36#37	20.16
					RB75#0	20.95
	16-QAM	15MHz	20175	1732.5	RB1#0	20.38
					RB1#37	20.42
					RB1#74	20.57
					RB36#0	20.13
					RB36#37	20.17
					RB75#0	20.15
	QPSK	15MHz	20325	1747.5	RB1#0	21.39
					RB1#37	21.38
					RB1#74	21.29
					RB36#0	20.7
					RB36#37	20.58
					RB75#0	21.15
	16-QAM	15MHz	20325	1747.5	RB1#0	20.29
					RB1#37	20.43
					RB1#74	20.21
					RB36#0	19.99
					RB36#37	20.49
					RB75#0	20.21

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency	Test RB	Measured

				(MHz)		[dBm]
LTE Babd4	QPSK	20MHz	20050	1720	RB1#0	21.21
					RB1#49	21.11
					RB1#99	21.37
					RB50#0	21.32
					RB50#49	21.23
					RB100#0	21.17
	16-QAM	20MHz	20050	1720	RB1#0	20.45
					RB1#49	20.22
					RB1#99	20.16
					RB50#0	20.24
					RB50#49	20.12
					RB100#0	20.42
	QPSK	20MHz	20175	1732.5	RB1#0	20.99
					RB1#49	20.99
					RB1#99	21.25
					RB50#0	21.02
					RB50#49	20.67
					RB100#0	20.45
	16-QAM	20MHz	20175	1732.5	RB1#0	20.13
					RB1#49	20.2
					RB1#99	20.42
					RB50#0	20.25
					RB50#49	20.33
					RB100#0	20.26
	QPSK	20MHz	20300	1745	RB1#0	21.3
					RB1#49	21.2
					RB1#99	21.2
					RB50#0	21.05
					RB50#49	21.15
					RB100#0	21.12
	16-QAM	20MHz	20300	1745	RB1#0	20.32
					RB1#49	20.36
					RB1#99	20.35
					RB50#0	20.06
					RB50#49	20.42
					RB100#0	20.16

LTE Band2:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	5MHz	18625	1852.5	RB1#0	21.2
					RB1#12	21.18
					RB1#24	21.28
					RB12#0	20.94
					RB12#11	21
					RB25#0	20.01
	16-QAM	5MHz	18625	1852.5	RB1#0	20.05
					RB1#12	19.95
					RB1#24	20.14
					RB12#0	20.19
					RB12#11	20.15
					RB25#0	20.18
	QPSK	5MHz	18900	1880	RB1#0	21.16
					RB1#12	20.8
					RB1#24	21
					RB12#0	20.44
					RB12#11	20.28
					RB25#0	20.05
	16-QAM	5MHz	18900	1880	RB1#0	20.37
					RB1#12	20.03
					RB1#24	20.09
					RB12#0	20.34
					RB12#11	20.26
					RB25#0	20.31
	QPSK	5MHz	19175	1907.5	RB1#0	21.06
					RB1#12	20.15
					RB1#24	21.21
					RB12#0	19.97
					RB12#11	20.24
					RB25#0	20.95
	16-QAM	5MHz	19175	1907.5	RB1#0	20.18
					RB1#12	20.07
					RB1#24	20.15

					RB12#0	20.19
					RB12#11	20.3
					RB25#0	20

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	10MHz	18650	1855	RB1#0	21.26
					RB1#24	21.12
					RB1#49	21.37
					RB25#0	20.83
					RB25#24	20.46
					RB50#0	20.97
	16-QAM	10MHz	18650	1855	RB1#0	20.92
					RB1#24	20.46
					RB1#49	21.07
					RB25#0	21.53
					RB25#24	21.34
					RB50#0	21
	QPSK	10MHz	18900	1880	RB1#0	21.2
					RB1#24	20.99
					RB1#49	21.11
					RB25#0	20.87
					RB25#24	21.2
					RB50#0	20.9
	16-QAM	10MHz	18900	1880	RB1#0	20.54
					RB1#24	20.16
					RB1#49	20.48
					RB25#0	20.46
					RB25#24	20.18
					RB50#0	20.09
	QPSK	10MHz	19150	1905	RB1#0	21.11
					RB1#24	21.12
					RB1#49	21.43
					RB25#0	21.46
					RB25#24	20.44
					RB50#0	20.97
	16-QAM	10MHz	19150	1905	RB1#0	20.11

					RB1#24	20.09
					RB1#49	20.3
					RB25#0	20.29
					RB25#24	20.1
					RB50#0	20.29

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	15MHz	18675	1857.5	RB1#0	21.27
					RB1#37	20.99
					RB1#74	21.41
					RB36#0	20.4
					RB36#37	20.84
					RB75#0	20.97
	16-QAM	15MHz	18675	1857.5	RB1#0	20.02
					RB1#37	20.1
					RB1#74	20.36
					RB36#0	20.33
					RB36#37	20.4
					RB75#0	20.18
	QPSK	15MHz	18900	1880	RB1#0	21.16
					RB1#37	20.9
					RB1#74	21.2
					RB36#0	20.41
					RB36#37	20.17
					RB75#0	20.08
	16-QAM	15MHz	18900	1880	RB1#0	20.52
					RB1#37	20.51
					RB1#74	20.42
					RB36#0	20.37
					RB36#37	20.35
					RB75#0	20.13
	QPSK	15MHz	19125	1902.5	RB1#0	21.23
					RB1#37	20.97
					RB1#74	21.35
					RB36#0	20.41
					RB36#37	20.36

					RB75#0	20.87
	16-QAM	15MHz	19125	1902.5	RB1#0	20.23
					RB1#37	20.16
					RB1#74	20.16
					RB36#0	20.13
					RB36#37	20.23
					RB75#0	20.32

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd2	QPSK	20MHz	18700	1860	RB1#0	21.27
					RB1#49	21.18
					RB1#99	21.11
					RB50#0	20.63
					RB50#49	21.12
					RB100#0	21.03
	16-QAM	20MHz	18700	1860	RB1#0	20.51
					RB1#49	20.38
					RB1#99	20.1
					RB50#0	20.51
					RB50#49	20.8
					RB100#0	20.96
	QPSK	20MHz	18900	1880	RB1#0	21.23
					RB1#49	20.96
					RB1#99	21.21
					RB50#0	20.57
					RB50#49	21.13
					RB100#0	21.18
	16-QAM	20MHz	18900	1880	RB1#0	21.25
					RB1#49	21.25
					RB1#99	21.02
					RB50#0	21.14
					RB50#49	21.14
					RB100#0	21.19
	QPSK	20MHz	19100	1900	RB1#0	21.46
					RB1#49	21.01
					RB1#99	21.7

					RB50#0	21.03
					RB50#49	21.5
					RB100#0	21.13
	16-QAM	20MHz	19100	1900	RB1#0	21.22
					RB1#49	21.04
					RB1#99	21.44
					RB50#0	20.96
					RB50#49	20.89
					RB100#0	20.91

LTE Band25:

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	5MHz	26065	1852.5	RB1#0	21.32
					RB1#12	21.17
					RB1#24	21.47
					RB12#0	21.15
					RB12#11	21.39
					RB25#0	20.17
	16-QAM	5MHz	26065	1852.5	RB1#0	20.39
					RB1#12	20.64
					RB1#24	20.4
					RB12#0	20.39
					RB12#11	20.22
					RB25#0	20.18
	QPSK	5MHz	26365	1882.5	RB1#0	21.19
					RB1#12	20.3
					RB1#24	21.27
					RB12#0	21.23
					RB12#11	20.16
					RB25#0	20.22
	16-QAM	5MHz	26365	1882.5	RB1#0	20.05
					RB1#12	20.05
					RB1#24	20.07
					RB12#0	19.97
					RB12#11	20.95
					RB25#0	20.21

	QPSK	5MHz	26665	1912.5	RB1#0	21.38
					RB1#12	21.04
					RB1#24	21.43
					RB12#0	21.08
					RB12#11	21.07
					RB25#0	20.32
	16-QAM	5MHz	26665	1912.5	RB1#0	20.49
					RB1#12	20.01
					RB1#24	20.66
					RB12#0	20.49
					RB12#11	20.14
					RB25#0	20.07

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	10MHz	26090	1855	RB1#0	21.42
					RB1#24	20.8
					RB1#49	21.37
					RB25#0	20.85
					RB25#24	20.32
					RB50#0	20.06
	16-QAM	10MHz	26090	1855	RB1#0	20.13
					RB1#24	20.19
					RB1#49	20.17
					RB25#0	19.98
					RB25#24	20
					RB50#0	20.17
	QPSK	10MHz	26365	1882.5	RB1#0	21.19
					RB1#24	20.9
					RB1#49	21.18
					RB25#0	21.07
					RB25#24	20.81
					RB50#0	20.3
	16-QAM	10MHz	26365	1882.5	RB1#0	20.69
					RB1#24	20.49
					RB1#49	20.44
					RB25#0	20.14

					RB25#24	20.08
					RB50#0	20.07
	QPSK	10MHz	26640	1910	RB1#0	21.35
					RB1#24	20.6
					RB1#49	21.35
					RB25#0	20.54
					RB25#24	20.3
					RB50#0	20.17
	16-QAM	10MHz	26640	1910	RB1#0	20.22
					RB1#24	19.98
					RB1#49	20.28
					RB25#0	20.33
					RB25#24	20.01
					RB50#0	20.05

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	15MHz	26115	1857.5	RB1#0	21.11
					RB1#37	21.28
					RB1#74	20.96
					RB36#0	21.12
					RB36#37	21.2
					RB75#0	20.68
	16-QAM	15MHz	26115	1857.5	RB1#0	20.58
					RB1#37	20.64
					RB1#74	20.34
					RB36#0	20.22
					RB36#37	20.08
					RB75#0	20.92
	QPSK	15MHz	26365	1882.5	RB1#0	20.31
					RB1#37	20.87
					RB1#74	21.34
					RB36#0	20.77
					RB36#37	21.27
					RB75#0	20.13
	16-QAM	15MHz	26365	1882.5	RB1#0	20.15
					RB1#37	20.09

					RB1#74	20.28
					RB36#0	20.1
					RB36#37	20.12
					RB75#0	20.38
	QPSK	15MHz	26615	1907.5	RB1#0	20.21
					RB1#37	20.47
					RB1#74	20.61
					RB36#0	20.42
					RB36#37	20.56
					RB75#0	20.11
	16-QAM	15MHz	26615	1907.5	RB1#0	20.35
					RB1#37	20.51
					RB1#74	20.38
					RB36#0	20.37
					RB36#37	20.37
					RB75#0	20.05

Operation Mode	Modulation	Band Width	Channel Number	Channel Frequency (MHz)	Test RB	Measured [dBm]
LTE Babd25	QPSK	20MHz	26140	1860	RB1#0	21.36
					RB1#49	21.28
					RB1#99	21.23
					RB50#0	21.04
					RB50#49	20.61
					RB100#0	20.12
	16-QAM	20MHz	26140	1860	RB1#0	20.06
					RB1#49	19.99
					RB1#99	20.07
					RB50#0	19.97
					RB50#49	20.92
					RB100#0	20.18
	QPSK	20MHz	26365	1882.5	RB1#0	21.31
					RB1#49	20.98
					RB1#99	21.21
					RB50#0	20.51
					RB50#49	20.38
					RB100#0	20.05

	16-QAM	20MHz	26365	1882.5	RB1#0	20.48
					RB1#49	19.96
					RB1#99	20.28
					RB50#0	20.15
					RB50#49	20.05
					RB100#0	20.02
	QPSK	20MHz	26590	1905	RB1#0	21.22
					RB1#49	20.18
					RB1#99	21.26
					RB50#0	20.37
					RB50#49	20.61
					RB100#0	20.1
	16-QAM	20MHz	26590	1905	RB1#0	20.16
					RB1#49	20.7
					RB1#99	20.32
					RB50#0	19.99
					RB50#49	20.01
					RB100#0	20.16

11.4.2 SAR TEST RESULTS

GSM850:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
GPRS(2 TX slots)	Bottom Face	0	251	848.8	30.08	30.50	1.102	-0.07	0.899	0.990
	Edge 3	0	251	848.8	30.08	30.50	1.102	0.06	0.295	0.325
	Edge 4	0	251	848.8	30.08	30.50	1.102	-0.04	0.423	0.466
	Bottom Face	16	251	848.8	33.11	33.50	1.094	-0.07	0.265	0.290
	Edge 1	0	251	848.8	33.11	33.50	1.094	0.09	0.113	0.124
	Edge 3	12	251	848.8	33.11	33.50	1.094	0.06	0.037	0.040
	Edge 4	7	251	848.8	33.11	33.50	1.094	-0.04	0.113	0.124
	Bottom Face	0	128	824.2	29.87	30.50	1.156	0.06	0.906	1.047
	Bottom Face	0	189	836.4	30.03	30.50	1.114	0.03	0.949	**1.057**
	Bottom Face	0	189	836.4	30.03	30.50	1.114	0.05	**0.936**	1.043

GSM1900:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
GPRS(2 TX slots)	Bottom Face	0	810	1909.8	26.49	27.00	1.125	-0.06	1.05	**1.181**
	Edge 3	0	810	1909.8	26.49	27.00	1.125	0.09	0.372	0.418
	Edge 4	0	810	1909.8	26.49	27.00	1.125	-0.02	0.688	0.774
	Bottom Face	16	810	1909.8	29.57	30.00	1.104	-0.07	0.362	0.400
	Edge 1	0	810	1909.8	29.57	30.00	1.104	-0.03	0.102	0.113
	Edge 3	12	810	1909.8	29.57	30.00	1.104	0.05	0.021	0.023
	Edge 4	7	810	1909.8	29.57	30.00	1.104	0.02	0.275	0.304
	Bottom Face	0	512	1850.2	26.40	27.00	1.148	-0.01	0.973	1.117
	Bottom Face	0	661	1880	26.34	27.00	1.164	-0.03	0.996	1.159

WCDMA Band V:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
RMC 12.2K	Bottom Face	0	4233	846.6	20.50	21.00	1.122	0.09	0.923	**1.036**
	Edge 3	0	4233	846.6	20.50	21.00	1.122	0.06	0.319	0.358
	Edge 4	0	4233	846.6	20.50	21.00	1.122	0.04	0.468	0.525
	Bottom Face	16	4233	846.6	23.53	24.00	1.114	0.09	0.277	0.309
	Edge 1	0	4233	846.6	23.53	24.00	1.114	0.05	0.086	0.096
	Edge 3	12	4233	846.6	23.53	24.00	1.114	0.06	0.052	0.058
	Edge 4	7	4233	846.6	23.53	24.00	1.114	0.04	0.193	0.215
	Bottom Face	0	4132	826.4	20.02	21.00	1.253	0.02	0.821	1.029
	Bottom Face	0	4182	836.4	20.03	21.00	1.250	-0.07	0.819	1.024

WCDMA Band IV:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
RMC 12.2K	Bottom Face	0	1312	1712.4	19.56	20.00	1.107	0.02	0.926	**1.025**
	Bottom Face	0	1312	1712.4	19.56	20.00	1.107	0.05	**0.923**	1.021
	Edge 3	0	1312	1712.4	19.56	20.00	1.107	0.07	0.296	0.328

	Edge 4	0	1312	1712.4	19.56	20.00	1.107	-0.03	0.613	0.678
	Bottom Face	16	1312	1712.4	22.57	23.00	1.104	-0.11	0.351	0.388
	Edge 3	12	1312	1712.4	22.57	23.00	1.104	0.06	0.018	0.020
	Edge 4	7	1312	1712.4	22.57	23.00	1.104	0.05	0.262	0.289
	Bottom Face	0	1413	1732.6	19.53	20.00	1.114	-0.03	0.878	0.978
	Bottom Face	0	1513	1752.6	19.17	20.00	1.211	-0.07	0.833	1.008

WCDMA Band II:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
RMC 12.2K	Bottom Face	0	9262	1852.4	19.63	20.00	1.089	0.11	1.17	**1.274**
	Bottom Face	0	9262	1852.4	19.63	20.00	1.089	0.07	**1.13**	1.230
	Edge 3	0	9262	1852.4	19.63	20.00	1.089	-0.05	0.417	0.454
	Edge 4	0	9262	1852.4	19.63	20.00	1.089	-0.09	0.715	0.779
	Bottom Face	16	9262	1852.4	22.65	23.00	1.084	0.04	0.453	0.491
	Edge 3	12	9262	1852.4	22.65	23.00	1.084	0.03	0.089	0.096
	Edge 4	7	9262	1852.4	22.65	23.00	1.084	-0.06	0.342	0.371
	Bottom Face	0	9400	1880	19.18	20.00	1.208	-0.02	1.02	1.232
	Bottom Face	0	9538	1907.6	19.30	20.00	1.175	0.04	0.982	1.154

CDMA BC0:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
RTAP 153.6Kbps	Bottom Face	0	384	836.52	22.19	22.50	1.074	0.02	0.788	**0.846**
RTAP 153.6Kbps	Edge 3	0	384	836.52	22.19	22.50	1.074	-0.05	0.271	0.291
RTAP 153.6Kbps	Edge 4	0	384	836.52	22.19	22.50	1.074	-0.07	0.425	0.456
RTAP 153.6Kbps	Bottom Face	16	384	836.52	24.21	24.50	1.069	0.02	0.236	0.252
RTAP 153.6Kbps	Edge 1	0	384	836.52	24.21	24.50	1.069	-0.07	0.097	0.104
RTAP 153.6Kbps	Edge 3	12	384	836.52	24.21	24.50	1.069	-0.05	0.037	0.040
RTAP 153.6Kbps	Edge 4	7	384	836.52	24.21	24.50	1.069	-0.07	0.162	0.173
RTAP 153.6Kbps	Bottom Face	0	1013	824.7	22.16	22.50	1.081	0.03	0.743	0.804
RTAP 153.6Kbps	Bottom Face	0	777	848.31	22.18	22.50	1.076	0.01	0.755	0.813
RETAP 4096Bits	Bottom Face	0	384	836.52	22.12	22.50	1.091	0.07	0.746	0.814

CDMA BC1:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
RTAP 153.6Kbps	Bottom Face	0	25	1851.25	22.27	22.50	1.054	-0.1	0.961	**1.013**
RTAP 153.6Kbps	Edge 3	0	25	1851.25	22.27	22.50	1.054	-0.03	0.385	0.406
RTAP 153.6Kbps	Edge 4	0	25	1851.25	22.27	22.50	1.054	-0.06	0.627	0.661
RTAP 153.6Kbps	Bottom Face	16	25	1851.25	24.28	24.50	1.052	-0.1	0.388	0.408
RTAP 153.6Kbps	Edge 1	0	25	1851.25	24.28	24.50	1.052	0.08	0.053	0.056
RTAP 153.6Kbps	Edge 3	12	25	1851.25	24.28	24.50	1.052	-0.03	0.081	0.085

RTAP 153.6Kbps	Edge 4	7	25	1851.25	24.28	24.50	1.052	-0.06	0.326	0.343
RTAP 153.6Kbps	Bottom Face	0	600	1880	22.24	22.50	1.062	0.07	0.928	0.985
RTAP 153.6Kbps	Bottom Face	0	1175	1908.75	22.14	22.50	1.086	-0.09	0.906	0.984
RETAP 4096Bits	Bottom Face	0	600	1880	22.19	22.50	1.074	0.03	0.877	0.942

LTE Band 17:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10M QPSK 1Rb0 offset	Bottom Face	0	23780	709	20.90	21.00	1.023	-0.03	0.725	**0.742**
10M QPSK 1Rb0 offset	Edge 3	0	23780	709	20.90	21.00	1.023	0.06	0.243	0.249
10M QPSK 1Rb0 offset	Edge 4	0	23780	709	20.90	21.00	1.023	-0.05	0.411	0.421
10M QPSK 1Rb0 offset	Bottom Face	16	23780	709	22.88	23.00	1.028	-0.03	0.317	0.326
10M QPSK 1Rb0 offset	Edge 3	12	23780	709	22.88	23.00	1.028	0.06	0.132	0.136
10M QPSK 1Rb0 offset	Edge 4	7	23780	709	22.88	23.00	1.028	-0.05	0.258	0.265
10M QPSK 25Rb24 offset	Bottom Face	0	23800	711	20.65	21.00	1.084	0.07	0.679	0.736
10M QPSK 25Rb24 offset	Edge 3	0	23800	711	20.65	21.00	1.084	0.05	0.228	0.247
10M QPSK 25Rb24 offset	Edge 4	0	23800	711	20.65	21.00	1.084	-0.03	0.402	0.436
10M QPSK 25Rb24 offset	Bottom Face	16	23800	711	22.69	23.00	1.074	0.07	0.303	0.325
10M QPSK 25Rb24 offset	Edge 3	12	23800	711	22.69	23.00	1.074	0.05	0.125	0.134
10M QPSK 25Rb24 offset	Edge 4	7	23800	711	22.69	23.00	1.074	-0.03	0.246	0.264

LTE Band 13:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10M QPSK 1Rb49 offset	Bottom Face	0	23230	782	20.76	21.00	1.057	-0.05	0.741	**0.783**
10M QPSK 1Rb49 offset	Edge 3	0	23230	782	20.76	21.00	1.057	-0.03	0.258	0.273
10M QPSK 1Rb49 offset	Edge 4	0	23230	782	20.76	21.00	1.057	0.01	0.436	0.461
10M QPSK 1Rb49 offset	Bottom Face	16	23230	782	22.73	23.00	1.064	-0.05	0.329	0.350
10M QPSK 1Rb49 offset	Edge 3	12	23230	782	22.73	23.00	1.064	-0.03	0.147	0.156
10M QPSK 1Rb49 offset	Edge 4	7	23230	782	22.73	23.00	1.064	0.01	0.265	0.282
10M QPSK 25Rb24 offset	Bottom Face	0	23230	782	20.93	21.00	1.016	-0.07	0.733	0.745

10M QPSK 25Rb24 offset	Edge 3	0	23230	782	20.93	21.00	1.016	0.05	0.251	0.255
10M QPSK 25Rb24 offset	Edge 4	0	23230	782	20.93	21.00	1.016	0.04	0.411	0.418
10M QPSK 25Rb24 offset	Bottom Face	16	23230	782	22.95	23.00	1.012	-0.07	0.306	0.310
10M QPSK 25Rb24 offset	Edge 3	12	23230	782	22.95	23.00	1.012	0.05	0.139	0.141
10M QPSK 25Rb24 offset	Edge 4	7	23230	782	22.95	23.00	1.012	0.04	0.252	0.255

LTE Band 5:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10M QPSK 1Rb49 offset	Bottom Face	0	20525	836.5	20.90	21.00	1.023	0.03	0.781	**0.799**
10M QPSK 1Rb49 offset	Edge 3	0	20525	836.5	20.90	21.00	1.023	0.06	0.268	0.274
10M QPSK 1Rb49 offset	Edge 4	0	20525	836.5	20.90	21.00	1.023	-0.07	0.455	0.466
10M QPSK 1Rb49 offset	Bottom Face	16	20525	836.5	22.91	23.00	1.021	0.03	0.346	0.353
10M QPSK 1Rb49 offset	Edge 3	12	20525	836.5	22.91	23.00	1.021	0.06	0.188	0.192
10M QPSK 1Rb49 offset	Edge 4	7	20525	836.5	22.91	23.00	1.021	-0.07	0.273	0.279
10M QPSK 25Rb0 offset	Bottom Face	0	20600	844	20.68	21.00	1.076	-0.06	0.731	0.787
10M QPSK 25Rb0 offset	Edge 3	0	20600	844	20.68	21.00	1.076	-0.07	0.252	0.271
10M QPSK 25Rb0 offset	Edge 4	0	20600	844	20.68	21.00	1.076	0.11	0.436	0.469
10M QPSK 25Rb0 offset	Bottom Face	16	20600	844	22.69	23.00	1.074	-0.06	0.319	0.343
10M QPSK 25Rb0 offset	Edge 3	12	20600	844	22.69	23.00	1.074	-0.07	0.172	0.185
10M QPSK 25Rb0 offset	Edge 4	7	20600	844	22.69	23.00	1.074	0.11	0.258	0.277

LTE Band 4:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
20M QPSK 1Rb99 offset	Bottom Face	0	20050	1720	21.37	21.50	1.030	-0.04	0.684	**0.705**
20M QPSK 1Rb99 offset	Edge 3	0	20050	1720	21.37	21.50	1.030	0.02	0.235	0.242
20M QPSK 1Rb99 offset	Edge 4	0	20050	1720	21.37	21.50	1.030	0.05	0.562	0.579

20M QPSK 1Rb99 offset	Bottom Face	16	20050	1720	23.30	23.50	1.047	-0.03	0.418	0.438
20M QPSK 1Rb99 offset	Edge 3	12	20050	1720	23.30	23.50	1.047	-0.02	0.111	0.116
20M QPSK 1Rb99 offset	Edge 4	7	20050	1720	23.30	23.50	1.047	0.04	0.319	0.334
20M QPSK 50Rb0 offset	Bottom Face	0	2050	1720	21.32	21.50	1.042	-0.03	0.653	0.681
20M QPSK 50Rb0 offset	Edge 3	0	2050	1720	21.32	21.50	1.042	-0.09	0.229	0.239
20M QPSK 50Rb0 offset	Edge 4	0	2050	1720	21.32	21.50	1.042	0.08	0.56	0.584
20M QPSK 50Rb0 offset	Bottom Face	16	2050	1720	23.26	23.50	1.057	-0.02	0.405	0.428
20M QPSK 50Rb0 offset	Edge 3	12	2050	1720	23.26	23.50	1.057	0.07	0.109	0.115
20M QPSK 50Rb0 offset	Edge 4	7	2050	1720	23.26	23.50	1.057	-0.05	0.311	0.329

LTE Band 2:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
20M QPSK 1Rb99 offset	Bottom Face	0	19100	1900	21.70	22.00	1.072	-0.04	0.931	0.998
20M QPSK 1Rb99 offset	Edge 3	0	19100	1900	21.70	22.00	1.072	0.06	0.357	0.383
20M QPSK 1Rb99 offset	Edge 4	0	19100	1900	21.70	22.00	1.072	-0.07	0.652	0.699
20M QPSK 1Rb99 offset	Bottom Face	16	19100	1900	23.72	24.00	1.067	-0.05	0.533	0.568
20M QPSK 1Rb99 offset	Edge 1	0	19100	1900	23.72	24.00	1.067	0.03	0.086	0.092
20M QPSK 1Rb99 offset	Edge 3	12	19100	1900	23.72	24.00	1.067	-0.01	0.181	0.193
20M QPSK 1Rb99 offset	Edge 4	7	19100	1900	23.72	24.00	1.067	-0.06	0.422	0.450
20M QPSK 1Rb0 offset	Bottom Face	0	18700	1860	21.27	22.00	1.183	0.09	0.913	1.080
20M QPSK 1Rb0 offset	Bottom Face	0	18900	1880	21.23	22.00	1.194	-0.04	0.946	**1.130**
20M QPSK 50Rb49 offset	Bottom Face	0	19100	1900	21.50	22.00	1.122	-0.02	0.902	1.012
20M QPSK 50Rb49 offset	Edge 3	0	19100	1900	21.50	22.00	1.122	-0.07	0.347	0.389
20M QPSK 50Rb49 offset	Edge 4	0	19100	1900	21.50	22.00	1.122	0.06	0.631	0.708
20M QPSK 50Rb49 offset	Bottom Face	16	19100	1900	23.52	24.00	1.117	0.03	0.519	0.580
20M QPSK 50Rb49	Edge 1	0	19100	1900	23.52	24.00	1.117	0.09	0.081	0.090

offset										
20M QPSK 50Rb49 offset	Edge 3	12	19100	1900	23.52	24.00	1.117	-0.01	0.177	0.198
20M QPSK 50Rb49 offset	Edge 4	7	19100	1900	23.52	24.00	1.117	-0.05	0.416	0.465
20M QPSK 50Rb49 offset	Bottom Face	0	18700	1860	21.12	22.00	1.225	-0.02	0.893	1.094
20M QPSK 50Rb49 offset	Bottom Face	0	18900	1880	21.13	22.00	1.222	-0.02	0.876	1.070
20M QPSK 100Rb0 offset	Bottom Face	0	18900	1880	21.18	21.50	1.076	0.03	0.865	0.931
20M QPSK 100Rb0 offset	Edge 3	0	18900	1880	21.18	21.50	1.076	-0.02	0.309	0.333
20M QPSK 100Rb0 offset	Edge 4	0	18900	1880	21.18	21.50	1.076	-0.04	0.617	0.664
20M QPSK 100Rb0 offset	Bottom Face	16	18900	1880	23.18	23.50	1.076	0.05	0.513	0.552
20M QPSK 100Rb0 offset	Edge 1	0	18900	1880	23.18	23.50	1.076	0.02	0.072	0.078
20M QPSK 100Rb0 offset	Edge 3	12	18900	1880	23.18	23.50	1.076	-0.08	0.172	0.185
20M QPSK 100Rb0 offset	Edge 4	7	18900	1880	23.18	23.50	1.076	-0.06	0.405	0.436
20M QPSK 100Rb0 offset	Bottom Face	0	18700	1860	21.03	21.50	1.114	0.03	0.832	0.927
20M QPSK 100Rb0 offset	Bottom Face	0	19100	1900	21.13	21.50	1.089	0.03	0.855	0.931

LTE Band 25:

Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
20M QPSK 1Rb0 offset	Bottom Face	0	26140	1860	21.36	21.50	1.033	0.06	1.1	**1.136**
20M QPSK 1Rb0 offset	Edge 3	0	26140	1860	21.36	21.50	1.033	0.02	0.392	0.405
20M QPSK 1Rb0 offset	Edge 4	0	26140	1860	21.36	21.50	1.033	-0.03	0.681	0.703
20M QPSK 1Rb0 offset	Bottom Face	16	26140	1860	23.39	23.50	1.026	-0.07	0.692	0.710
20M QPSK 1Rb0 offset	Edge 3	12	26140	1860	23.39	23.50	1.026	0.04	0.195	0.200
20M QPSK 1Rb0 offset	Edge 4	7	26140	1860	23.39	23.50	1.026	-0.06	0.483	0.495
20M QPSK 1Rb0 offset	Bottom Face	0	26365	1882.5	21.31	21.50	1.045	-0.03	1.01	1.055
20M QPSK 1Rb99 offset	Bottom Face	0	26590	1905	21.26	21.50	1.057	-0.05	0.983	1.039
20M QPSK 50Rb0 offset	Bottom Face	0	26140	1860	21.04	21.50	1.112	0.02	0.965	1.073
20M QPSK 50Rb0 offset	Edge 3	0	26140	1860	21.04	21.50	1.112	0.07	0.381	0.424
20M QPSK 50Rb0 offset	Edge 4	0	26140	1860	21.04	21.50	1.112	-0.03	0.654	0.727

20M QPSK 50Rb0 offset	Bottom Face	16	26140	1860	23.02	23.50	1.117	-0.06	0.661	0.738
20M QPSK 50Rb0 offset	Edge 3	12	26140	1860	23.02	23.50	1.117	-0.02	0.182	0.203
20M QPSK 50Rb0 offset	Edge 4	7	26140	1860	23.02	23.50	1.117	0.09	0.467	0.522
20M QPSK 50Rb0 offset	Bottom Face	0	26365	1882.5	20.51	21.50	1.256	0.02	0.876	1.100
20M QPSK 50Rb49 offset	Bottom Face	0	26590	1905	20.61	21.50	1.227	0.02	0.853	1.047
20M QPSK 100Rb0 offset	Bottom Face	0	26140	1860	20.12	20.50	1.091	-0.08	0.847	0.924
20M QPSK 100Rb0 offset	Edge 3	0	26140	1860	20.12	20.50	1.091	-0.06	0.325	0.355
20M QPSK 100Rb0 offset	Edge 4	0	26140	1860	20.12	20.50	1.091	-0.08	0.613	0.669
20M QPSK 100Rb0 offset	Bottom Face	16	26590	1905	22.14	22.50	1.086	0.03	0.622	0.676
20M QPSK 100Rb0 offset	Edge 3	12	26590	1905	22.14	22.50	1.086	-0.02	0.163	0.177
20M QPSK 100Rb0 offset	Edge 4	7	26590	1905	22.14	22.50	1.086	-0.07	0.447	0.486
20M QPSK 100Rb0 offset	Bottom Face	0	26140	1860	20.05	20.50	1.109	-0.08	0.813	0.902
20M QPSK 100Rb0 offset	Bottom Face	0	26140	1860	20.10	20.50	1.096	-0.08	0.805	0.883

SAR Values for WLAN2.4G 802.11b:

Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Setting	Configure	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
Bottom Face	0	11	2462	-	1Mbps	15.53	16.00	1.114	-0.06	0.053	**0.059**
Edge 1	0	11	2462	-	1Mbps	15.53	16.00	1.114	-0.11	0.000715	0.001
Edge 3	0	11	2462	-	1Mbps	15.53	16.00	1.114	-0.06	0.051	0.057
Edge 4	0	11	2462	-	1Mbps	15.53	16.00	1.114	-0.02	0.011	0.012
Bottom Face	16	11	2462	-	1Mbps	15.53	16.00	1.114	-0.03	0.00682	0.008
Edge 3	12	11	2462	-	1Mbps	15.53	16.00	1.114	0.08	0.00697	0.008
Edge 4	7	11	2462	-	1Mbps	15.53	16.00	1.114	-0.05	0.00354	0.004

SAR Values for WLAN5G Band 1 802.11a:

Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Setting	Configure	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
Bottom Face	0	36	5180	-	6Mbps	14.20	14.50	1.072	-0.08	0.086	**0.092**
Edge 1	0	36	5180	-	6Mbps	14.20	14.50	1.072	0.06	0.00672	0.007
Edge 3	0	36	5180	-	6Mbps	14.20	14.50	1.072	-0.03	0.073	0.078
Edge 4	0	36	5180	-	6Mbps	14.20	14.50	1.072	-0.05	0.016	0.017
Bottom Face	16	36	5180	-	6Mbps	14.20	14.50	1.072	0.06	0.00439	0.005

Edge 3	12	36	5180	-	6Mbps	14.20	14.50	1.072	0.08	0.00586	0.006
Edge 4	7	36	5180	-	6Mbps	14.20	14.50	1.072	-0.02	0.00243	0.003

SAR Values for WLAN5G Band 4 802.11a:

Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Setting	Configure	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
Bottom Face	0	165	5825	-	6Mbps	13.57	14.00	1.104	-0.03	0.233	**0.257**
Edge 1	0	165	5825	-	6Mbps	13.57	14.00	1.104	0.11	0.017	0.019
Edge 3	0	165	5825	-	6Mbps	13.57	14.00	1.104	0.05	0.213	0.235
Edge 4	0	165	5825	-	6Mbps	13.57	14.00	1.104	0.03	0.055	0.061
Bottom Face	16	165	5825	-	6Mbps	13.57	14.00	1.104	-0.01	0.014	0.015
Edge 3	12	165	5825	-	6Mbps	13.57	14.00	1.104	0.06	0.021	0.023
Edge 4	7	165	5825	-	6Mbps	13.57	14.00	1.104	0.07	0.009	0.010

Note:
1. The value with blue color is the maximum SAR Value of each test band.
2. The value with orange color is the repeat SAR.
3. SAR test reduction and exclusion guidance
   (1) The SAR exclusion threshold for distances <50mm is defined by the following equation:

   (max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm).

   $\sqrt{\text{Frequency (GHz)}}$ ≤3.0

   (2) The SAR exclusion threshold for distances >50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

   a) at 100 MHz to 1500 MHz

   [(Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance- 50 mm) · (f (MHz)/150)] mW

   b) at > 1500 MHz and ≤ 6 GHz

   [Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance-50 mm) ·10] mW

   Evaluation (BT) = [10^(0/10)/5] *($2.480^{1/2}$) =0.315＜3.0, so SAR is not required for Bluetooth.
4. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor.
5. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   a. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   b. ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   c. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
6. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg.
7. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
8. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
9. A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
10. For the exposure positions that proximity sensor power reduction is applied for SAR compliance,

additional SAR testing with EUT transmitting full power in normal mode was performed: 1.6cm for bottom face, 1.2cm for edge 3, 0.7cm for edge 4.

2.4 GHz OFDM conditions:

	maximum output power		Scaling Factor	Maximun SAR of DSSS (W/kg)	adjusted SAR (W/kg)
	DSSS(dBm)	OFDM(dBm)			
Body	16	15	0.794	0.059	0.047

Note:
1. SAR is not required for the following 2.4 GHz OFDM conditions.
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

11.4.3 TEST GRAPH RESULTS:

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 07.07.2016

01-GSM850-GPRS(2 Tx slots)-Bottom Face-0cm-Ch189

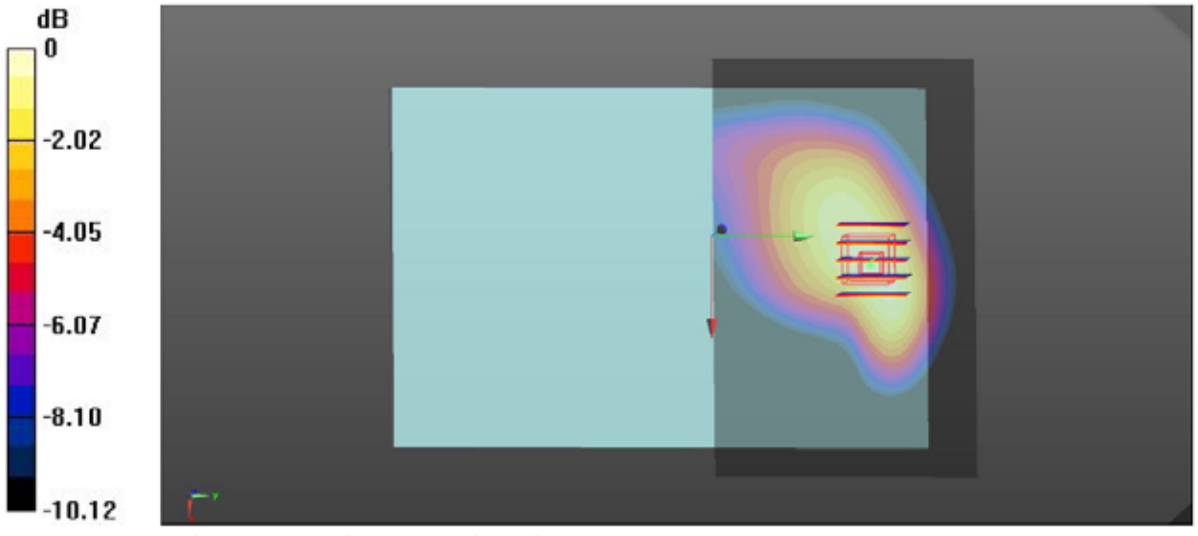
Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 836.4 MHz;Duty Cycle: 1:4.15
Medium: MSL_900_160707
Medium parameters used: f = 836.4 MHz; σ = 0.992 S/m; ε_r = 55.751; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.72, 9.72, 9.72); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch189/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.15 W/kg

Configuration/Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.402 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.949 W/kg; SAR(10 g) = 0.653 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



0 dB = 1.19 W/kg = 0.76 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

07-GSM1900-GPRS(2 Tx slots)-Bottom Face-0cm-Ch810-sensor on

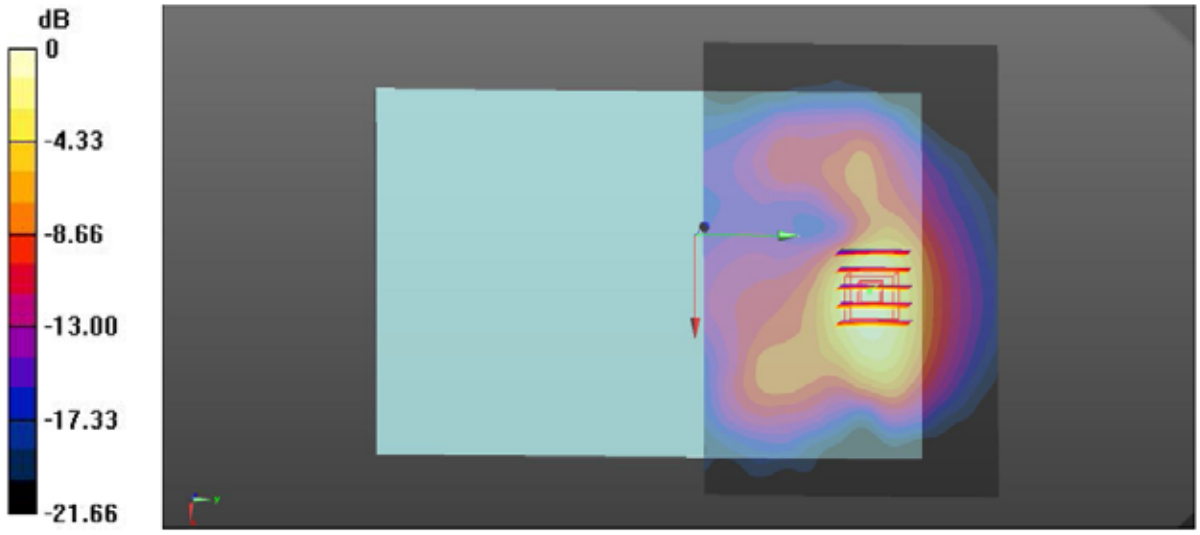
Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium: MSL_1900_160711
Medium parameters used: f = 1909.8 MHz; σ = 1.545 S/m; ε_r = 51.933; ρ = 1000 kg/m^3
Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch810/Area Scan (171x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.54 W/kg

Configuration/Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.681 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.606 W/kg
Maximum value of SAR (measured) = 1.57 W/kg



0 dB = 1.57 W/kg = 1.96 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 07.07.2016

02-WCDMA V-RMC 12.2K-Bottom Face-0cm-Ch4182

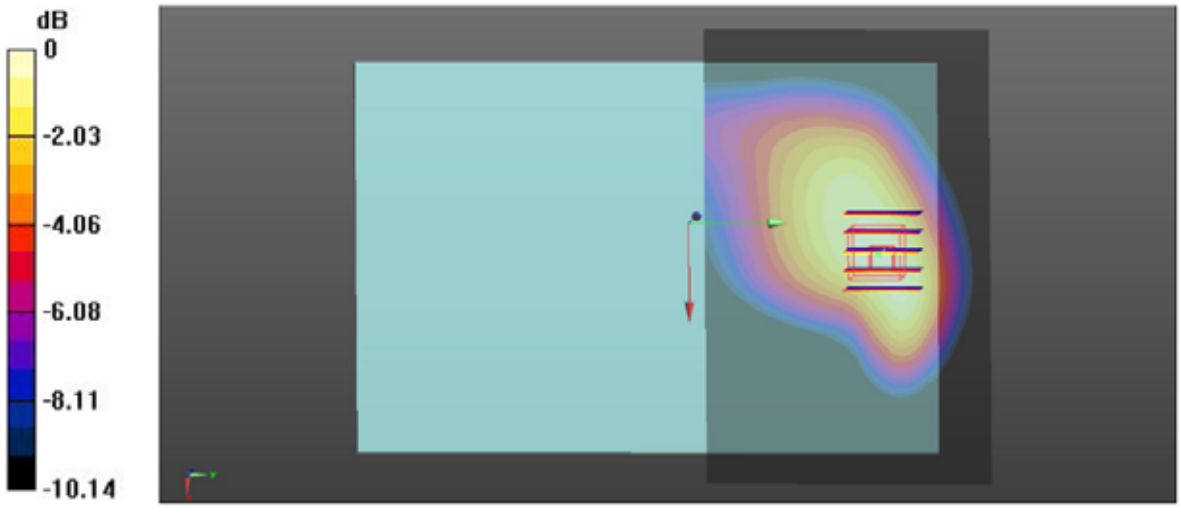
Communication System: UID 0, UMTS-FDD (WCDMA) (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_900_160707
Medium parameters used: f = 836.4 MHz; σ = 0.992 S/m; ε_r = 55.751; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.72, 9.72, 9.72); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch4182/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.08 W/kg

Configuration/Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.071 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.923 W/kg; SAR(10 g) = 0.642 W/kg
Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 1.04 W/kg = 0.17 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 13.07.2016

12-WCDMA IV-RMC 12.2K-Bottom Face-0cm-Ch1312-sensor on

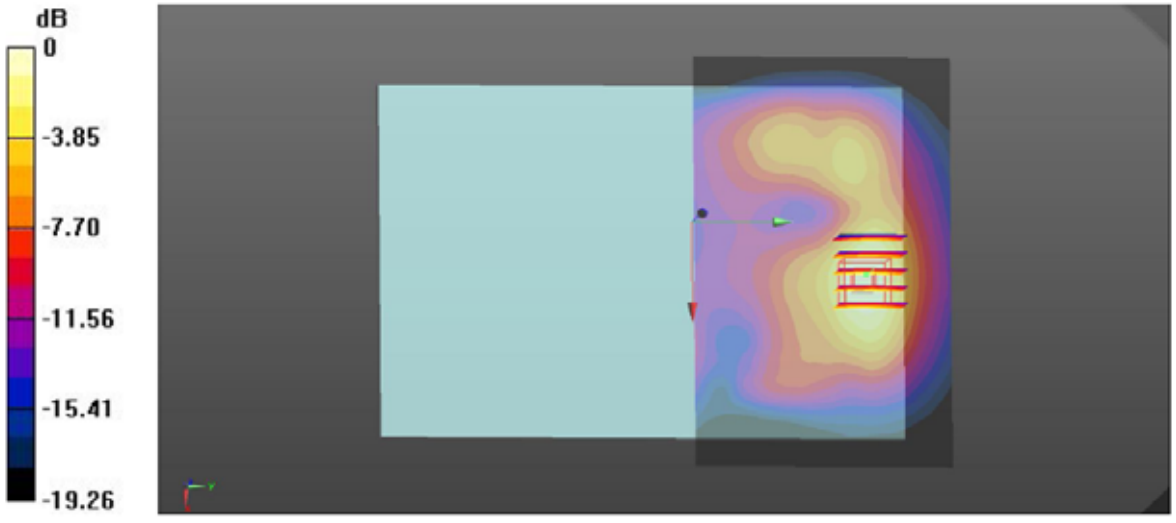
Communication System: UID 0, UMTS-FDD (WCDMA) (0); Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160713
Medium parameters used: f = 1712.4 MHz; σ = 1.451 S/m; ε_r = 52.075; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.7 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.86, 7.86, 7.86); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch1312/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.22 W/kg

Configuration/Ch1312/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.196 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.926 W/kg; SAR(10 g) = 0.548 W/kg
Maximum value of SAR (measured) = 1.18 W/kg



0 dB = 1.18 W/kg = 0.72 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

08-WCDMA II-RMC 12.2K-Bottom Face-0cm-Ch9262-sensor on

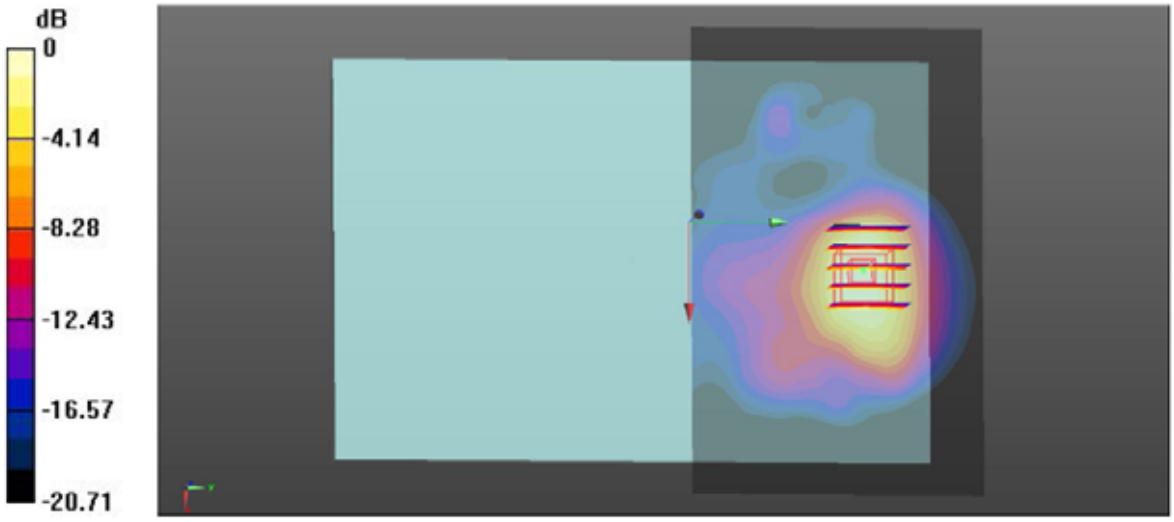
Communication System: UID 0, UMTS-FDD (WCDMA) (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160711
Medium parameters used: f = 1852.4 MHz; σ = 1.479 S/m; ε_r = 52.1; ρ = 1000 kg/m^3
Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch9262/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.65 W/kg

Configuration/Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.882 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.633 W/kg
Maximum value of SAR (measured) = 1.62 W/kg



0 dB = 1.62 W/kg = 2.10 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 07.07.2016

03-CDMA BC0-RTAP 153.6Kbps-Bottom Face-0cm-Ch384

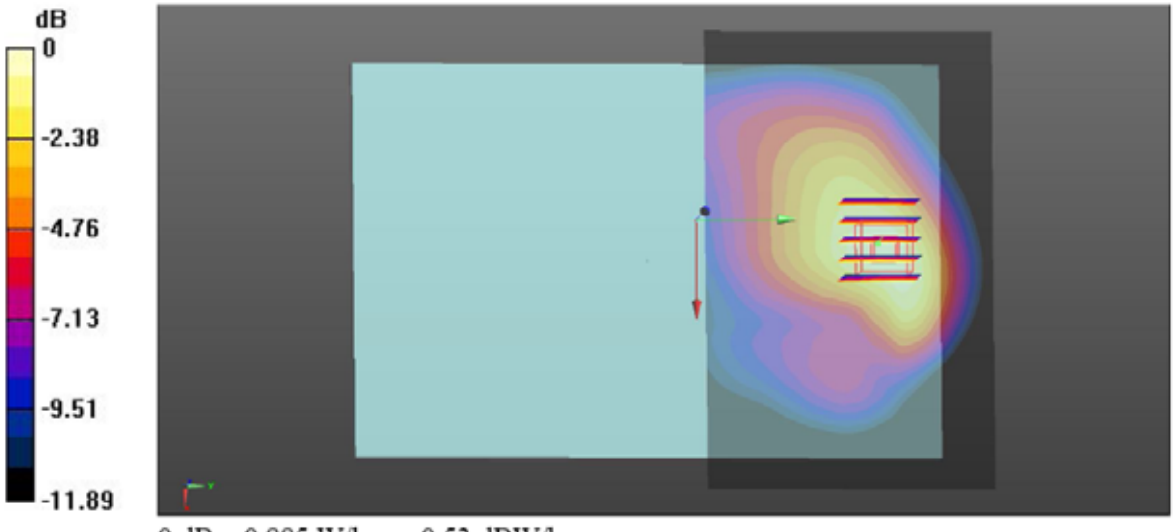
Communication System: UID 0, CDMA2000 (1xEV-DO, Rev. 0) (0); Frequency: 836.52 MHz;Duty Cycle: 1:2.377
Medium: MSL_900_160707
Medium parameters used: f = 837 MHz; σ = 0.993 S/m; ε_r = 55.744; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.72, 9.72, 9.72); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch384/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.879 W/kg

Configuration/Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.276 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.083 W/kg
SAR(1 g) = 0.788 W/kg; SAR(10 g) = 0.557 W/kg
Maximum value of SAR (measured) = 0.885 W/kg



0 dB = 0.885 W/kg = -0.53 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

09-CDMA BC1-RTAP 153.6Kbps-Bottom Face-0cm-Ch25-sensor on

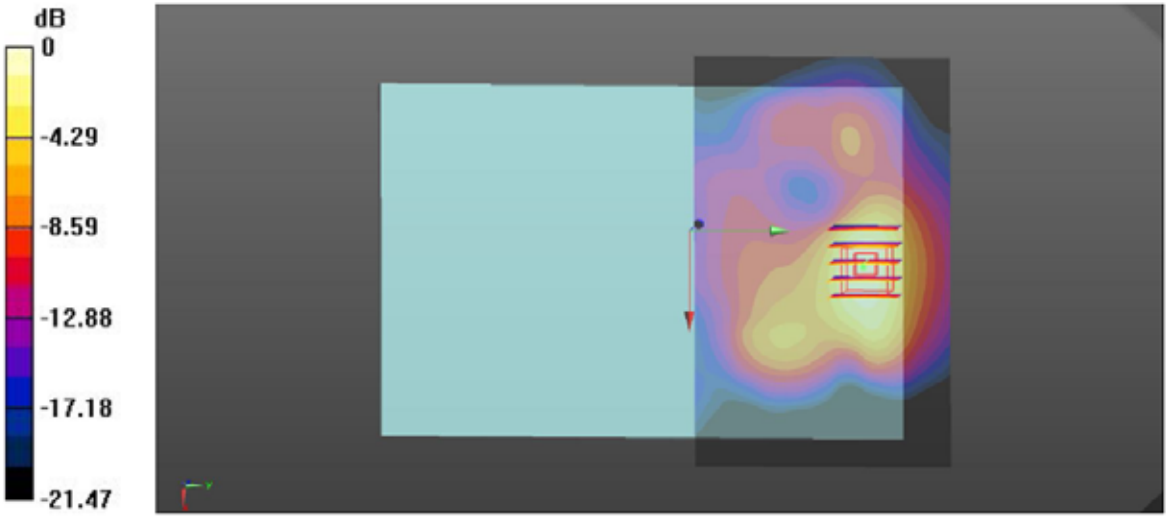
Communication System: UID 0, CDMA2000 (1xEV-DO, Rev. 0) (0); Frequency: 1851.25 MHz;Duty Cycle: 1:2.377
Medium: MSL_1900_160711
Medium parameters used: f = 1851.4 MHz; σ = 1.478 S/m; ε_r = 52.102; ρ = 1000 kg/m^3
Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch25/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.42 W/kg

Configuration/Ch25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.678 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 0.961 W/kg; SAR(10 g) = 0.604 W/kg
Maximum value of SAR (measured) = 1.44 W/kg



0 dB = 1.44 W/kg = 1.58 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 09.07.2016

06-LTE Band 13-10M-QPSK-1RB 49Offset-Bottom Face-0cm-Ch23230

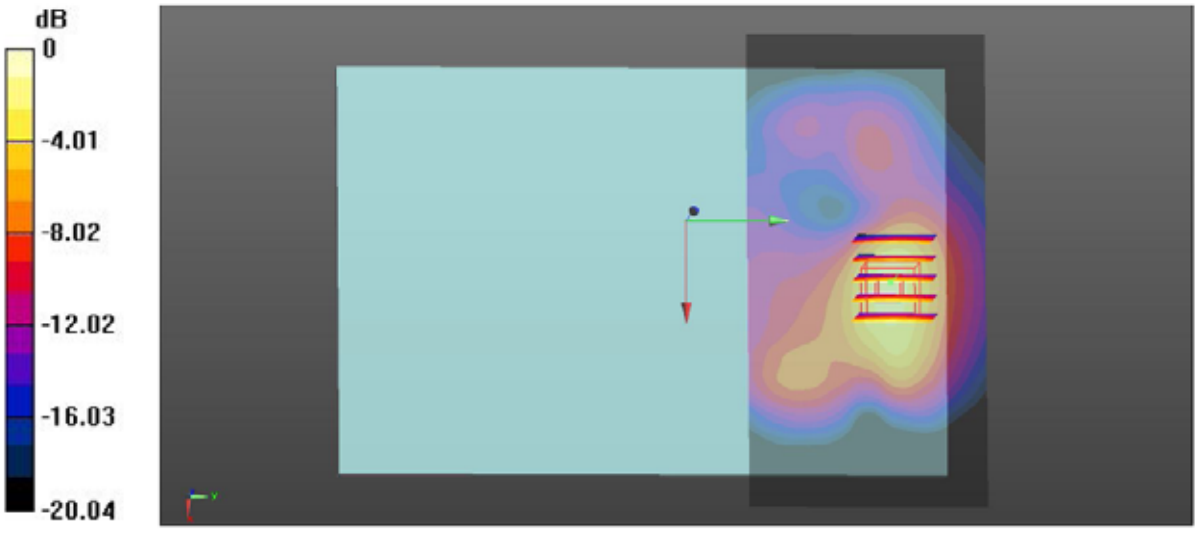
Communication System: UID 0, Generic LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL_750_160709
Medium parameters used: f = 782 MHz; σ = 0.992 S/m; ε_r = 54.935; ρ = 1000 kg/m^3
Ambient Temperature: 23.1 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.77, 9.77, 9.77); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/23230/Area Scan (161x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.839 W/kg

Configuration/23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.966 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.921 W/kg
SAR(1 g) = 0.741 W/kg; SAR(10 g) = 0.536 W/kg
Maximum value of SAR (measured) = 0.853 W/kg



0 dB = 0.853 W/kg = -0.69 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 09.07.2016

05-LTE Band 17-10M-QPSK-1RB 49Offset-Bottom Face-0cm-Ch23780

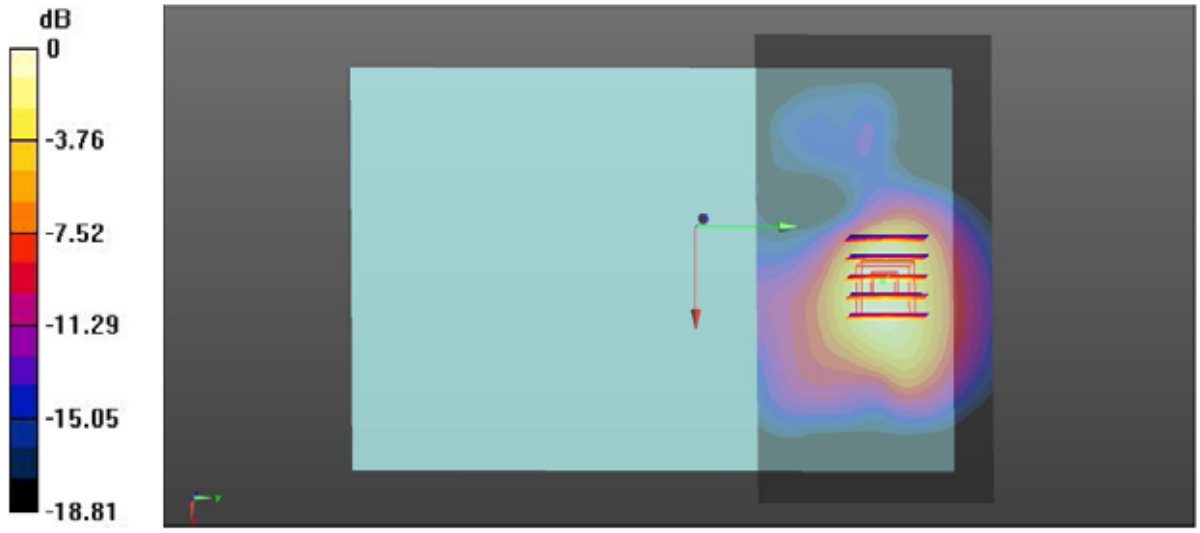
Communication System: UID 0, Generic LTE (0); Frequency: 704 MHz;Duty Cycle: 1:1
Medium: MSL_750_160709
Medium parameters used: f = 704 MHz; σ = 0.927 S/m; ε_r = 55.634; ρ = 1000 kg/m^3
Ambient Temperature: 23.1 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.77, 9.77, 9.77); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch23730/Area Scan (161x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.864 W/kg

Configuration/Ch23730/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.906 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.985 W/kg
SAR(1 g) = 0.725 W/kg; SAR(10 g) = 0.521 W/kg
Maximum value of SAR (measured) = 0.856 W/kg



0 dB = 0.856 W/kg = -0.68 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 07.07.2016

04-LTE Band 5-10M-QPSK-1RB 49Offset-Bottom Face-0cm-Ch20525

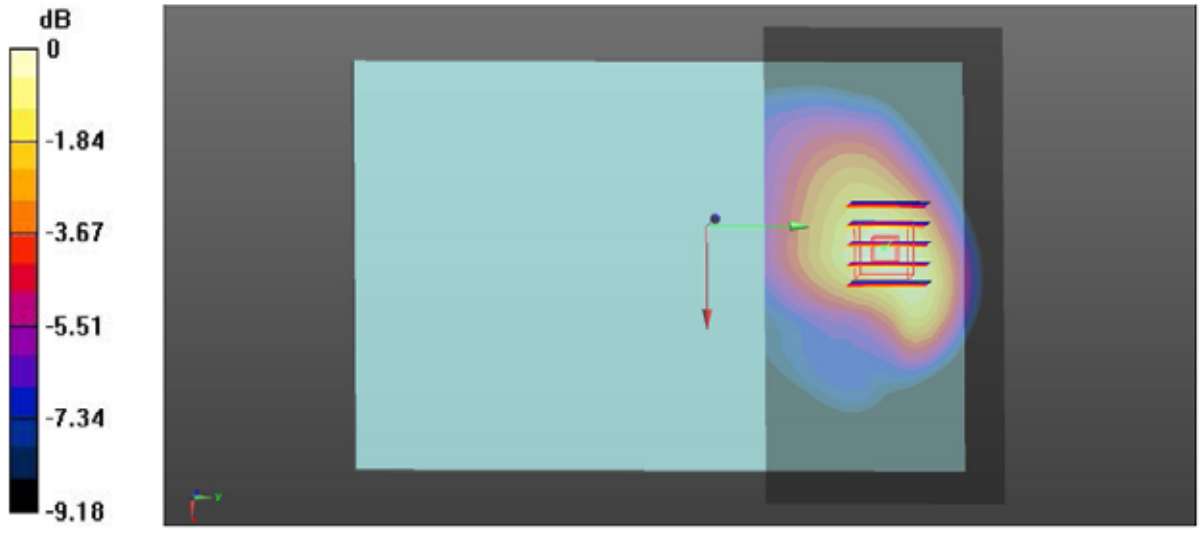
Communication System: UID 0, Generic LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_900_160707
Medium parameters used: f = 836.5 MHz; σ = 0.992 S/m; ε_r = 55.75; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.72, 9.72, 9.72); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch20525/Area Scan (161x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.862 W/kg

Configuration/Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.028 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.035 W/kg
SAR(1 g) = 0.781 W/kg; SAR(10 g) = 0.548 W/kg
Maximum value of SAR (measured) = 0.869 W/kg



0 dB = 0.869 W/kg = -0.61 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 13.07.2016

13-LTE Band 4-20M QPSK 1Rb 99Ooffset-Bottom Face-0cm-Ch20175-sensor on

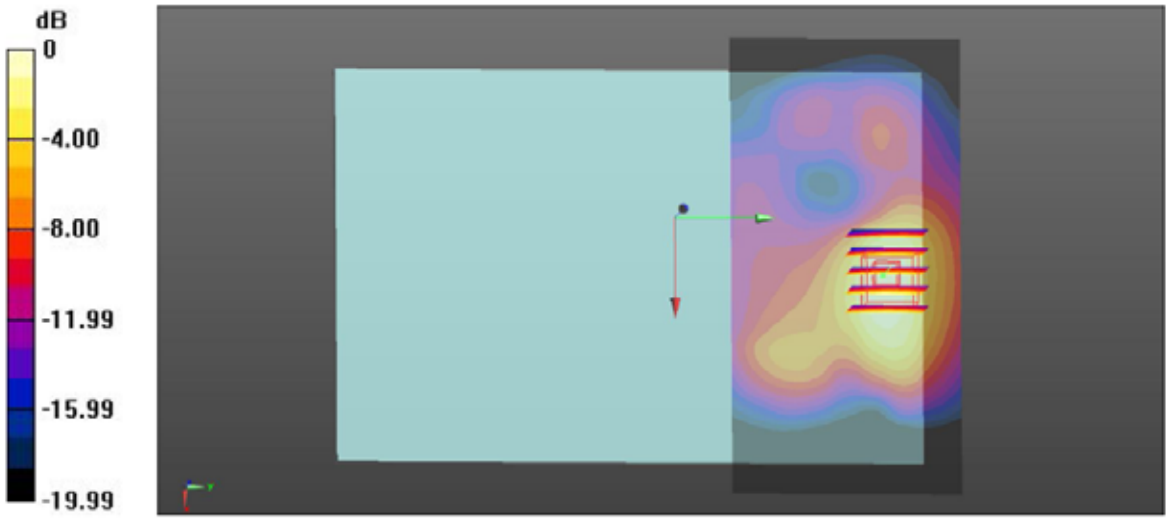
Communication System: UID 0, Generic LTE (0); Frequency: 1720 MHz;Duty Cycle: 1:1
Medium: MSL_1750_160713
Medium parameters used: f = 1720 MHz; σ = 1.459 S/m; ε_r = 52.055; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.7 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.86, 7.86, 7.86); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch20050/Area Scan (161x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.958 W/kg

Configuration/Ch20050/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.348 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.684 W/kg; SAR(10 g) = 0.396 W/kg
Maximum value of SAR (measured) = 0.918 W/kg



0 dB = 0.918 W/kg = -0.37 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

10-LTE Band 2-20M QPSK 1Rb 0Ooffset-Bottom Face-0cm-Ch18900-sensor on

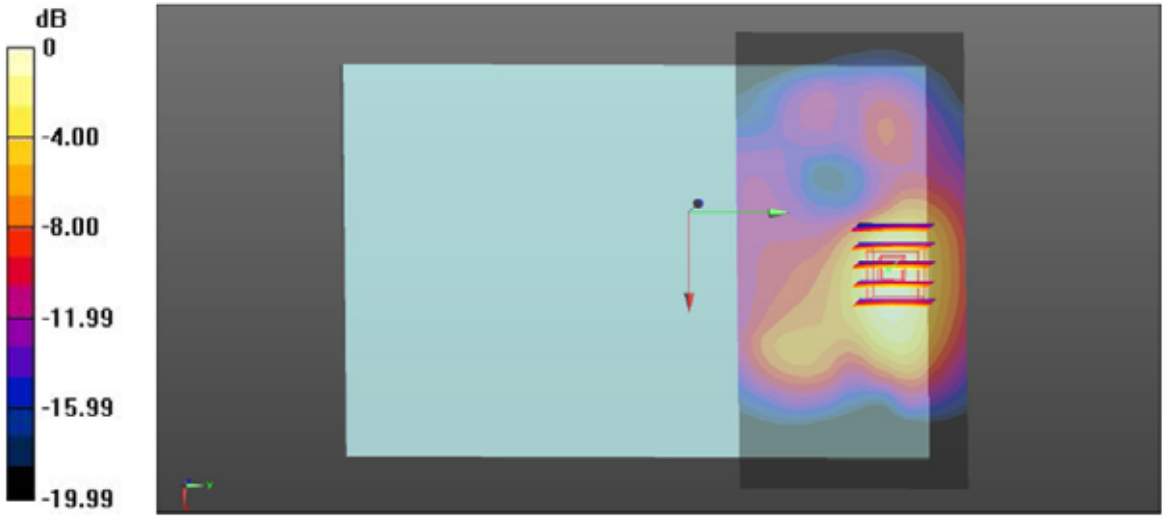
Communication System: UID 0, Generic LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160711
Medium parameters used: f = 1880.1 MHz; σ = 1.509 S/m; ε_r = 52.016; ρ = 1000 kg/m^3 Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch18900/Area Scan (161x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.44 W/kg

Configuration/Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.491 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.81 W/kg
SAR(1 g) = 0.946 W/kg; SAR(10 g) = 0.592 W/kg
Maximum value of SAR (measured) = 1.40 W/kg



0 dB = 1.40 W/kg = 1.46 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 11.07.2016

11-LTE Band 25-20M QPSK 1Rb 0Ooffset-Bottom Face-0cm-Ch26140-sensor on

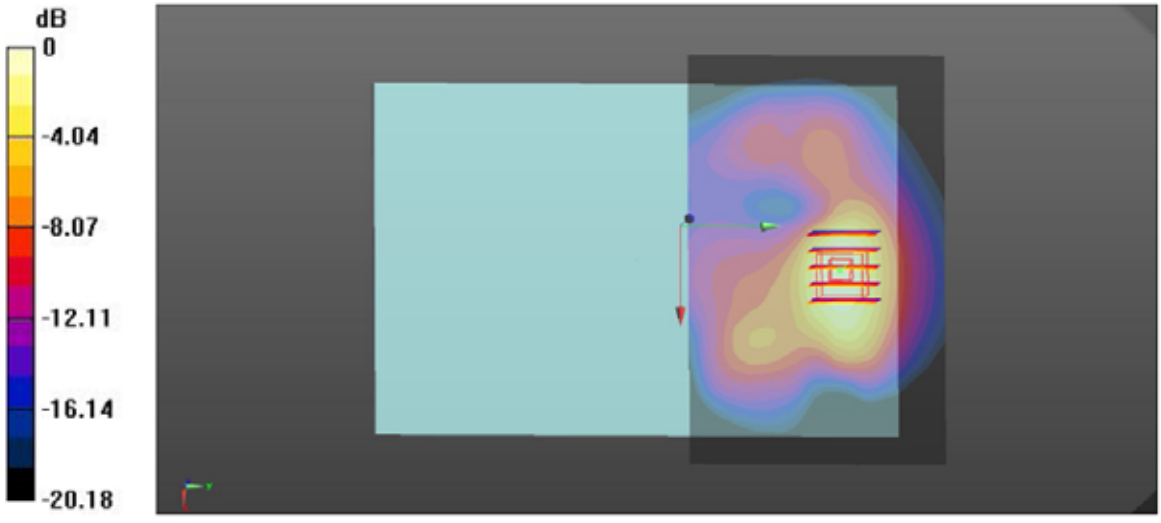
Communication System: UID 0, Generic LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_160711
Medium parameters used: f = 1860 MHz; σ = 1.487 S/m; ε_r = 52.079; ρ = 1000 kg/m^3
Ambient Temperature: 23.2 ℃; Liquid Temperature: 22.5 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.62, 7.62, 7.62); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch26140/Area Scan (161x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.52 W/kg

Configuration/Ch26140/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.549 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.647 W/kg
Maximum value of SAR (measured) = 1.46 W/kg



0 dB = 1.46 W/kg = 1.64 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 28.07.2016

14-WLAN2.4G-802.11b 1Mbps-Bottom Face-0cm-Ch11

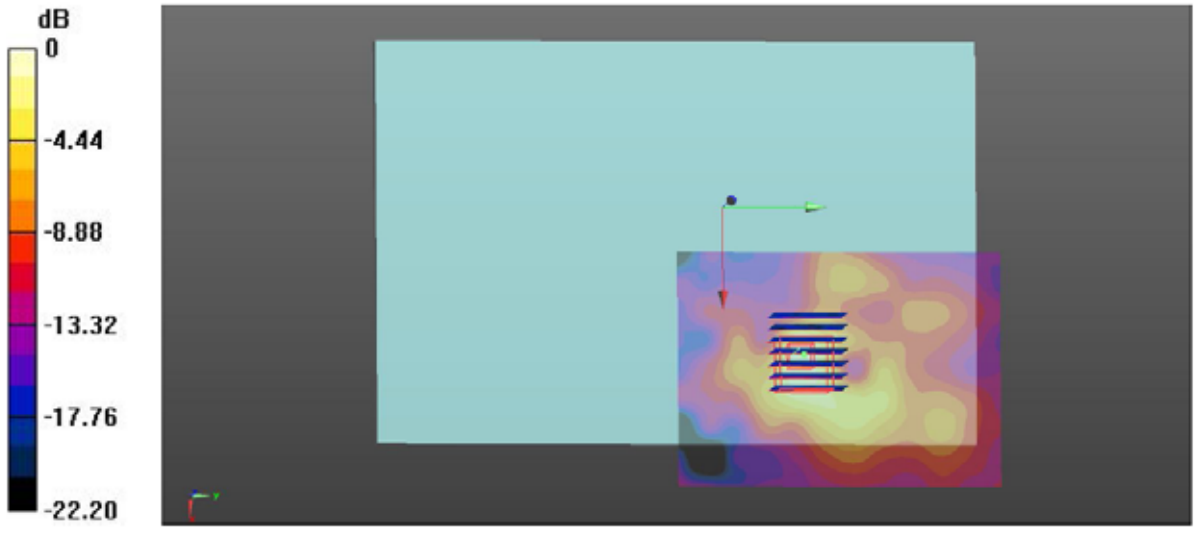
Communication System: UID 0, WIFI (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_160714
Medium parameters used: f = 2462 MHz; σ = 2.027 S/m; ε_r = 52.941; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.30, 7.30, 7.30); Calibrated: 26.08.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch11/Area Scan (81x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.102 W/kg

Configuration/Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.687 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.500 W/kg
SAR(1 g) = 0.053 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.0940 W/kg



0 dB = 0.0940 W/kg = -10.27 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 15.07.2016

15-WLAN5GHz Band 1-802.11a 6Mbps-Bottom Face-0cm-Ch36

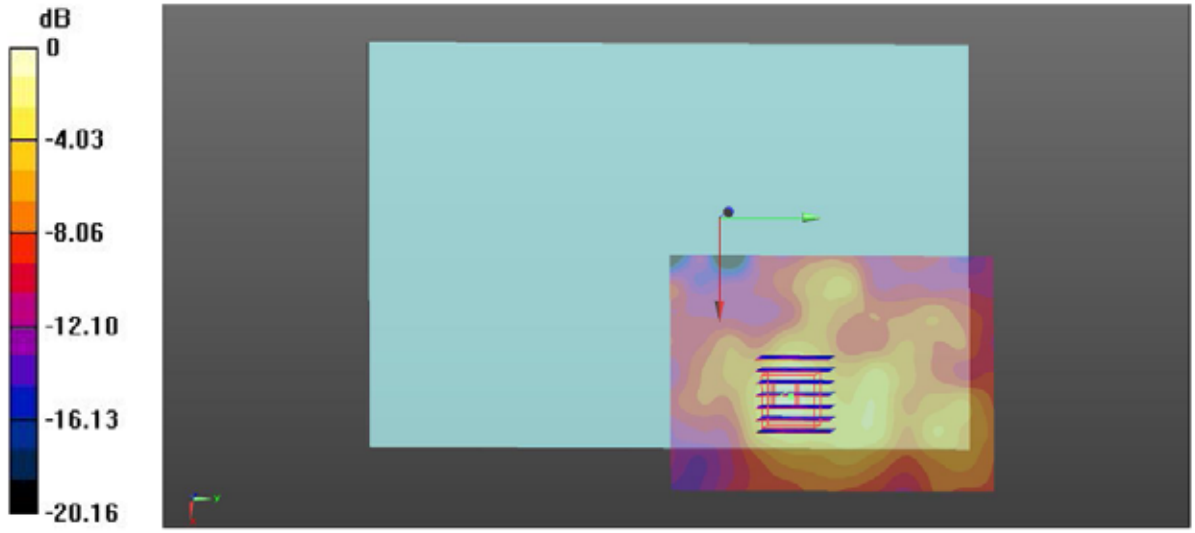
Communication System: UID 0, WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: MSL_5G_160715
Medium parameters used: f = 5180 MHz; σ = 5.165 S/m; ε_r = 50.963; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.40, 4.40, 4.40); Calibrated: 26.08.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch36/Area Scan (81x121x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.168 W/kg

Configuration/Ch36/Zoom Scan (11x11x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.462 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.034 W/kg
Maximum value of SAR (measured) = 0.171 W/kg



0 dB = 0.171 W/kg = -7.67 dBW/kg

Test Laboratory: EMTEK (Shenzhen) Co.,Ltd. Date/Time: 15.07.2016

16-WLAN5GHz Band 4-802.11a 6Mbps-Bottom Face-0cm-Ch165

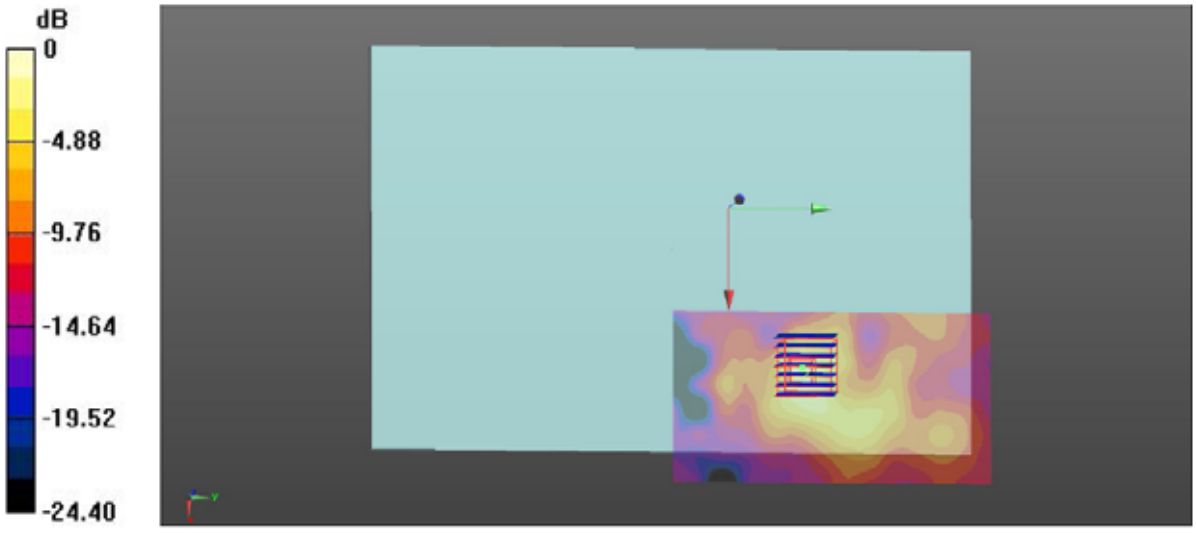
Communication System: UID 0, WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1
Medium: MSL_5G_160715
Medium parameters used: f = 5825 MHz; σ = 6.222 S/m; ε_r = 49.713; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3873; ConvF(4.40, 4.40, 4.40); Calibrated: 26.08.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 25.08.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch165/Area Scan (71x141x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.541 W/kg

Configuration/Ch165/Zoom Scan (11x11x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.698 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.083 W/kg
Maximum value of SAR (measured) = 0.599 W/kg



0 dB = 0.599 W/kg = -2.23 dBW/kg

11.4.4 Simultaneous Transmission Conditions

When standalone SAR is not required to be measured per FCC KDB 447498 D01v06 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

Estimated SAR=(max. power of channel, including tune-up tolerance, mW)/(min. test separation

distance, mm)$*(\sqrt{\text{Frequency (GHz)}}/7.5)$

Per FCC KDB 447498 D01v06 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.
Ration=(SAR1 + SAR2)1.5/Ri ≤ 0.04

Simultaneous Transmission Configurations	Head	Body	Note
GSM850/1900/WCDMA Band V/IV/II/CDMA BC0/BC1/LTE Band17/13/5/4/2/25 + 2.4GHz WLAN	N/A	Yes	
GSM850/1900/WCDMA Band V/IV/II/CDMA BC0/BC1/LTE Band17/13/5/4/2/25 + 2.4GHz BT	N/A	Yes	
GSM850/1900/WCDMA Band V/IV/II/CDMA BC0/BC1/LTE Band17/13/5/4/2/25 + 5GHz WLAN	N/A	Yes	

Note: Wlan2.4G and Bluetooth share the same antenna, So the Simultaneous SAR are not required for BT and wifi antenna.

Estimated $SAR_{BT(Body)}$= [10^(0/10)/5]*(√2.48)/7.5=0.042W/kg

WWAN Band		Exposure Position	1	2	3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
			WWAN	2.4GHz / 5.8GHz	2.4GHz Bluetooth		
			SAR (W/kg)	SAR (W/kg)	Estimated SAR (W/kg)		
GSM	GSM850	Bottom Face at 1.6 cm	0.29	0.015	0.042	0.305	0.332
		Edge3 at 1.2 cm	0.04	0.023	0.042	0.063	0.082
		Edge4 at 0.7 cm	0.124	0.01	0.042	0.134	0.166
		Bottom Face at 0cm	1.057	0.257	0.042	1.314	1.099
		Edge1 at 0cm	0.124	0.019	0.042	0.143	0.166
		Edge2 at 0cm					
		Edge3 at 0cm	0.325	0.235	0.042	0.560	0.367
		Edge4 at 0cm	0.466	0.061	0.042	0.527	0.508
	GSM1900	Bottom Face at 1.6 cm	0.4	0.015	0.042	0.415	0.442
		Edge3 at 1.2 cm	0.023	0.023	0.042	0.046	0.065
		Edge4 at 0.7 cm	0.304	0.01	0.042	0.314	0.346
		Bottom Face at 0cm	1.181	0.257	0.042	1.438	1.223
		Edge1 at 0cm	0.113	0.019	0.042	0.132	0.155
		Edge2 at 0cm					
		Edge3 at 0cm	0.418	0.235	0.042	0.653	0.460

		Edge4 at 0cm	0.774	0.061	0.042	0.835	0.816
WCDMA	Band V	Bottom Face at 1.6 cm	0.309	0.015	0.042	0.324	0.351
		Edge3 at 1.2 cm	0.058	0.023	0.042	0.081	0.100
		Edge4 at 0.7 cm	0.215	0.01	0.042	0.225	0.257
		Bottom Face at 0cm	1.036	0.257	0.042	1.293	1.078
		Edge1 at 0cm	0.096	0.019	0.042	0.115	0.138
		Edge2 at 0cm					
		Edge3 at 0cm	0.358	0.235	0.042	0.593	0.400
		Edge4 at 0cm	0.525	0.061	0.042	0.586	0.567
	Band IV	Bottom Face at 1.6 cm	0.388	0.015	0.042	0.403	0.430
		Edge3 at 1.2 cm	0.02	0.023	0.042	0.043	0.062
		Edge4 at 0.7 cm	0.289	0.01	0.042	0.299	0.331
		Bottom Face at 0cm	1.025	0.257	0.042	1.282	1.067
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.328	0.235	0.042	0.563	0.370
		Edge4 at 0cm	0.678	0.061	0.042	0.739	0.720
	Band II	Bottom Face at 1.6 cm	0.491	0.015	0.042	0.506	0.533
		Edge3 at 1.2 cm	0.096	0.023	0.042	0.119	0.138
		Edge4 at 0.7 cm	0.371	0.01	0.042	0.381	0.413
		Bottom Face at 0cm	1.274	0.257	0.042	**1.531**	**1.316**
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.454	0.235	0.042	0.689	0.496
		Edge4 at 0cm	0.779	0.061	0.042	0.840	0.821
CDMA	BC0	Bottom Face at 1.6 cm	0.252	0.015	0.042	0.267	0.294
		Edge3 at 1.2 cm	0.04	0.023	0.042	0.063	0.082
		Edge4 at 0.7 cm	0.173	0.01	0.042	0.183	0.215
		Bottom Face at 0cm	0.846	0.257	0.042	1.103	0.888
		Edge1 at 0cm	0.104	0.019	0.042	0.123	0.146
		Edge2 at 0cm					
		Edge3 at 0cm	0.291	0.235	0.042	0.526	0.333
		Edge4 at 0cm	0.456	0.061	0.042	0.517	0.498
	BC1	Bottom Face at 1.6 cm	0.408	0.015	0.042	0.423	0.450
		Edge3 at 1.2 cm	0.085	0.023	0.042	0.108	0.127
		Edge4 at 0.7 cm	0.343	0.01	0.042	0.353	0.385

		Bottom Face at 0cm	1.013	0.257	0.042	1.270	1.055
		Edge1 at 0cm	0.056	0.019	0.042	0.075	0.098
		Edge2 at 0cm					
		Edge3 at 0cm	0.406	0.235	0.042	0.641	0.448
		Edge4 at 0cm	0.661	0.061	0.042	0.722	0.703
LTE	Band 17	Bottom Face at 1.6 cm	0.326	0.015	0.042	0.341	0.368
		Edge3 at 1.2 cm	0.136	0.023	0.042	0.159	0.178
		Edge4 at 0.7 cm	0.265	0.01	0.042	0.275	0.307
		Bottom Face at 0cm	0.742	0.257	0.042	0.999	0.784
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.249	0.235	0.042	0.484	0.291
		Edge4 at 0cm	0.421	0.061	0.042	0.482	0.463
	Band 13	Bottom Face at 1.6 cm	0.35	0.015	0.042	0.365	0.392
		Edge3 at 1.2 cm	0.156	0.023	0.042	0.179	0.198
		Edge4 at 0.7 cm	0.282	0.01	0.042	0.292	0.324
		Bottom Face at 0cm	0.783	0.257	0.042	1.040	0.825
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.273	0.235	0.042	0.508	0.315
		Edge4 at 0cm	0.461	0.061	0.042	0.522	0.503
	Band 5	Bottom Face at 1.6 cm	0.353	0.015	0.042	0.368	0.395
		Edge3 at 1.2 cm	0.192	0.023	0.042	0.215	0.234
		Edge4 at 0.7 cm	0.279	0.01	0.042	0.289	0.321
		Bottom Face at 0cm	0.799	0.257	0.042	1.056	0.841
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.274	0.235	0.042	0.509	0.316
		Edge4 at 0cm	0.466	0.061	0.042	0.527	0.508
	Band 4	Bottom Face at 1.6 cm	0.438	0.015	0.042	0.453	0.480
		Edge3 at 1.2 cm	0.116	0.023	0.042	0.139	0.158
		Edge4 at 0.7 cm	0.334	0.01	0.042	0.344	0.376
		Bottom Face at 0cm	0.705	0.257	0.042	0.962	0.747
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.242	0.235	0.042	0.477	0.284

		Edge4 at 0cm	0.579	0.061	0.042	0.640	0.621
	Band 2	Bottom Face at 1.6 cm	0.58	0.015	0.042	0.595	0.622
		Edge3 at 1.2 cm	0.198	0.023	0.042	0.221	0.240
		Edge4 at 0.7 cm	0.465	0.01	0.042	0.475	0.507
		Bottom Face at 0cm	1.13	0.257	0.042	1.387	1.172
		Edge1 at 0cm	0.092	0.019	0.042	0.111	0.134
		Edge2 at 0cm					
		Edge3 at 0cm	0.389	0.235	0.042	0.624	0.431
		Edge4 at 0cm	0.708	0.061	0.042	0.769	0.750
	Band 25	Bottom Face at 1.6 cm	0.71	0.015	0.042	0.725	0.752
		Edge3 at 1.2 cm	0.2	0.023	0.042	0.223	0.242
		Edge4 at 0.7 cm	0.495	0.01	0.042	0.505	0.537
		Bottom Face at 0cm	1.136	0.257	0.042	1.393	1.178
		Edge1 at 0cm					
		Edge2 at 0cm					
		Edge3 at 0cm	0.405	0.235	0.042	0.640	0.447
		Edge4 at 0cm	0.703	0.061	0.042	0.764	0.745

WWAN Band		Exposure Position	1	2	1+2 Summed SAR (W/kg)
			WWAN	5.2GHz	
			SAR (W/kg)	SAR (W/kg)	
GSM	GSM850	Bottom Face at 1.6 cm	0.29	0.005	0.295
		Edge3 at 1.2 cm	0.04	0.006	0.046
		Edge4 at 0.7 cm	0.124	0.003	0.127
		Bottom Face at 0cm	1.057	0.092	1.149
		Edge1 at 0cm	0.124	0.007	0.131
		Edge2 at 0cm			
		Edge3 at 0cm	0.325	0.078	0.403
		Edge4 at 0cm	0.466	0.017	0.483
	GSM1900	Bottom Face at 1.6 cm	0.4	0.005	0.405
		Edge3 at 1.2 cm	0.023	0.006	0.029
		Edge4 at 0.7 cm	0.304	0.003	0.307
		Bottom Face at 0cm	1.181	0.092	1.273
		Edge1 at 0cm	0.113	0.007	0.120
		Edge2 at 0cm			
		Edge3 at 0cm	0.418	0.078	0.496

		Edge4 at 0cm	0.774	0.017	0.791
WCDMA	Band V	Bottom Face at 1.6 cm	0.309	0.005	0.314
		Edge3 at 1.2 cm	0.058	0.006	0.064
		Edge4 at 0.7 cm	0.215	0.003	0.218
		Bottom Face at 0cm	1.036	0.092	1.128
		Edge1 at 0cm	0.096	0.007	0.103
		Edge2 at 0cm			
		Edge3 at 0cm	0.358	0.078	0.436
		Edge4 at 0cm	0.525	0.017	0.542
	Band IV	Bottom Face at 1.6 cm	0.388	0.005	0.393
		Edge3 at 1.2 cm	0.02	0.006	0.026
		Edge4 at 0.7 cm	0.289	0.003	0.292
		Bottom Face at 0cm	1.025	0.092	1.117
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.328	0.078	0.406
		Edge4 at 0cm	0.678	0.017	0.695
	Band II	Bottom Face at 1.6 cm	0.491	0.005	0.496
		Edge3 at 1.2 cm	0.096	0.006	0.102
		Edge4 at 0.7 cm	0.371	0.003	0.374
		Bottom Face at 0cm	1.274	0.092	1.366
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.454	0.078	0.532
		Edge4 at 0cm	0.779	0.017	0.796
CDMA	BC0	Bottom Face at 1.6 cm	0.252	0.005	0.257
		Edge3 at 1.2 cm	0.04	0.006	0.046
		Edge4 at 0.7 cm	0.173	0.003	0.176
		Bottom Face at 0cm	0.846	0.092	0.938
		Edge1 at 0cm	0.104	0.007	0.111
		Edge2 at 0cm			
		Edge3 at 0cm	0.291	0.078	0.369
		Edge4 at 0cm	0.456	0.017	0.473
	BC1	Bottom Face at 1.6 cm	0.408	0.005	0.413
		Edge3 at 1.2 cm	0.085	0.006	0.091
		Edge4 at 0.7 cm	0.343	0.003	0.346

		Bottom Face at 0cm	1.013	0.092	1.105
		Edge1 at 0cm	0.056	0.007	0.063
		Edge2 at 0cm			
		Edge3 at 0cm	0.406	0.078	0.484
		Edge4 at 0cm	0.661	0.017	0.678
LTE	Band 17	Bottom Face at 1.6 cm	0.326	0.005	0.331
		Edge3 at 1.2 cm	0.136	0.006	0.142
		Edge4 at 0.7 cm	0.265	0.003	0.268
		Bottom Face at 0cm	0.742	0.092	0.834
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.249	0.078	0.327
		Edge4 at 0cm	0.421	0.017	0.438
	Band 13	Bottom Face at 1.6 cm	0.35	0.005	0.355
		Edge3 at 1.2 cm	0.156	0.006	0.162
		Edge4 at 0.7 cm	0.282	0.003	0.285
		Bottom Face at 0cm	0.783	0.092	0.875
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.273	0.078	0.351
		Edge4 at 0cm	0.461	0.017	0.478
	Band 5	Bottom Face at 1.6 cm	0.353	0.005	0.358
		Edge3 at 1.2 cm	0.192	0.006	0.198
		Edge4 at 0.7 cm	0.279	0.003	0.282
		Bottom Face at 0cm	0.799	0.092	0.891
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.274	0.078	0.352
		Edge4 at 0cm	0.466	0.017	0.483
	Band 4	Bottom Face at 1.6 cm	0.438	0.005	0.443
		Edge3 at 1.2 cm	0.116	0.006	0.122
		Edge4 at 0.7 cm	0.334	0.003	0.337
		Bottom Face at 0cm	0.705	0.092	0.797
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.242	0.078	0.320

		Edge4 at 0cm	0.579	0.017	0.596
	Band 2	Bottom Face at 1.6 cm	0.58	0.005	0.585
		Edge3 at 1.2 cm	0.198	0.006	0.204
		Edge4 at 0.7 cm	0.465	0.003	0.468
		Bottom Face at 0cm	1.13	0.092	1.222
		Edge1 at 0cm	0.092	0.007	0.099
		Edge2 at 0cm			
		Edge3 at 0cm	0.389	0.078	0.467
		Edge4 at 0cm	0.708	0.017	0.725
	Band 25	Bottom Face at 1.6 cm	0.71	0.005	0.715
		Edge3 at 1.2 cm	0.2	0.006	0.206
		Edge4 at 0.7 cm	0.495	0.003	0.498
		Bottom Face at 0cm	1.136	0.092	1.228
		Edge1 at 0cm			
		Edge2 at 0cm			
		Edge3 at 0cm	0.405	0.078	0.483
		Edge4 at 0cm	0.703	0.017	0.720

12 700MHZ TO 3GHZ MEASUREMENT UNCERTAINTY

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangluar	Triangular	U-Shape
Multi-plying Factor[(a)]	1/K[(b)]	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity
(b) K is the coverage factor

Table 12 Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

No.	Description	Type	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6	N	1	1	1	6	6	∞
2	Isotropy	B	3.0	R	$\sqrt{3}$	0.7	0.7	1.2	1.2	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
continue										
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.20	9.07	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						18.40	18.14	\

Table 12.1. Uncertainty Budget for frequency range 300 MHz to 3 GHz

No.	Description	Type	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.5	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	3.0	R	$\sqrt{3}$	0.7	0.7	1.2	1.2	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
10	RF ambient conditions-reflection	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.6	N	1	1	1	3.6	3.6	5
16	Drift of output power	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.5	N	1	0.64	0.43	1.6	1.1	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	2.5	N	1	0.6	0.49	1.5	1.2	520
continue										
Combined standard uncertainty			$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					10.23	10.08	256
Expanded uncertainty (confidence interval of 95 %)			$u_e = 2u_c$					20.46	20.16	\

Table 12.2. Uncertainty Budget for frequency range 3 GHz to 6 GHz

13 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5181A	MY50145187	2016-5-16	1year
2	RF Power Meter. Dual Channel	BOONTON	4232A	10539	2016-5-16	1year
3	Power Sensor	BOONTON	51011EMC	34236/34238	2016-5-16	1year
4	Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50-140 822zk	2016-5-16	1year
5	Signal Analyzer	Agilent	N9010A	My53470879	2016-5-16	1year
6	Network Analyzer	Agilent	E5071C	MY46316645	2016-5-16	1year
7	E-Field Probe	SPEAG	EX3DV4	3873	2015-8-26	1year
8	DAE	SPEAG	DAE4	1341	2015-8-25	1year
9	Validation Kit 750MHz	SPEAG	D750V3	1078	2014-6-23	3years
10	Validation Kit 900MHz	SPEAG	D900V2	1d162	2014-1-14	3years
11	Validation Kit 1750MHz	SPEAG	D1750V2	1023	2014-6-17	3years
12	Validation Kit 1950MHz	SPEAG	D1950V3	1151	2014-1-10	3years
13	Validation Kit 2450MHz	SPEAG	D2450V2	927	2014-1-13	3years
14	Validation Kit 5GHz	SPEAG	D5GHzV2	1169	2014-1-7	3years
15	Dual Directional Coupler	Agilent	EE393	TW5451008	2016-5-16	1year
16	10dB Attenuator	Mini-Circuits	15542	3 1344	2016-5-16	1year
17	10dB Attenuator	Mini-Circuits	15542	3 1415	2016-5-16	1year
18	30dB Attenuator	Mini-Circuits	15542	3 1420	2016-5-16	1year
19	Power Amplifier	MILMEGA	80RF1000-175	1059345	2016-5-16	1 Year
20	Power Amplifier	MILMEGA	AS0102-55	1018770	2016-5-16	1 Year
21	Power Amplifier	MILMEGA	AS1860-50	1059346	2016-5-16	1 Year
22	Power Meter	Agilent	N1918A	MY54180006	2016-5-16	1 Year
23	ELI V5.0	SPEAG	QD 0VA 022 AA	1231	N/A	N/A

24	Device Holder	SPEAG	N/A	N/A	N/A	N/A

END OF REPORT BODY