

## FCC RF Exposure report



The following samples were submitted and identified on behalf of the client as:

**Product Name** Portable Computer  
**Marketing Name** Framework Laptop  
**Brand Name** Framework  
**Model No.** FRANBP0000  
**Company Name** Framework Computer Inc  
**Company Address** 1870 Ogden Dr, Burlingame, CA, 94010  
**Standards** IEEE/ANSI C95.1-1992, IEEE 1528-2013,  
**FCC ID** 2AZR6-FRANBBAT12  
**Date of Receipt** Apr. 29, 2021  
**Date of Test(s)** Jun. 27, 2021 ~ Jul. 01, 2021  
**Date of Issue** Jul. 09, 2021  
 In the configuration tested, the EUT complied with the standards specified above.

#### Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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#### Signed on behalf of SGS

| Clerk / Ruby Ou | PM / Jasper Wang | Asst. Manager / John Yeh |
|-----------------|------------------|--------------------------|
| Ruby Ou         | Jasper Wang      | John Yeh                 |

Date: Jul. 09, 2021

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## Revision History

| Report Number | Revision | Description                  | Issue Date    |
|---------------|----------|------------------------------|---------------|
| EN/2021/40017 | Rev.00   | Initial creation of document | Jul. 09, 2021 |
|               |          |                              |               |
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## 0. Guidance applied

- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- IEC/IEEE 62209-1528:2020
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note  
(Interim Procedure for Device Operation at 6GHz-10GHz)
- IEC TR 63170:2018
- IEC 62479:2010
- FCC KDB 865664 D01 v01r04
- FCC KDB 865664 D02 v01r02
- FCC KDB 447498 D01 v06
- FCC KDB 616217 D04 v01r02
- FCC KDB 248227 D01 v02r02

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# 1. General Information

## 1.1 Testing Laboratory

|                                                                                                |                                                             |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| SGS Taiwan Ltd. Central RF Lab                                                                 |                                                             |
| 1F, No. 8, Alley 15, Lane 120, Sec. 1, NeiHu Road, Neihu District, Taipei City, 11493, Taiwan. |                                                             |
| FCC Designation Number                                                                         | TW0029                                                      |
| No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan       |                                                             |
| FCC Designation Number                                                                         | TW0027                                                      |
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## 1.2 Details of Applicant

|                 |                                      |
|-----------------|--------------------------------------|
| Company Name    | Framework Computer Inc               |
| Company Address | 1870 Ogden Dr, Burlingame, CA, 94010 |

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### 1.3 Description of EUT

#### General Information of Host:

|                          |                                                                                                                                |                     |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Equipment Under Test     | Portable Computer                                                                                                              |                     |
| Marketing Name           | Framework Laptop                                                                                                               |                     |
| Brand Name               | Framework                                                                                                                      |                     |
| Model No.                | FRANBP0000                                                                                                                     |                     |
| FCC ID                   | 2AZR6-FRANBBAT12                                                                                                               |                     |
| Mode of Operation        | <input checked="" type="checkbox"/> WLAN802.11 a/b/g/n/ac/ax(20M/40M80M/160M)<br><input checked="" type="checkbox"/> Bluetooth |                     |
| Duty Cycle               | WLAN802.11 a/b/g/n/ac/ax(20M/40M/80M/160M)                                                                                     | Refer to page 30-35 |
|                          | Bluetooth                                                                                                                      | 74.7%               |
| TX Frequency Range (MHz) | WLAN802.11 b/g/n/ax(20M)                                                                                                       | 2412 — 2462         |
|                          | WLAN802.11 n/ax(40M)                                                                                                           | 2422 — 2452         |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.2G                                                                                                 | 5180 — 5240         |
|                          | WLAN802.11 n/ac/ax(40M) 5.2G                                                                                                   | 5190 — 5230         |
|                          | WLAN802.11 ac/ax(80M) 5.2G                                                                                                     | 5210                |
|                          | WLAN802.11 ac/ax(160M) 5.2G                                                                                                    | 5250                |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.3G                                                                                                 | 5260 — 5320         |
|                          | WLAN802.11 n/ac/ax(40M) 5.3G                                                                                                   | 5270 — 5310         |
|                          | WLAN802.11 ac/ax(80M) 5.3G                                                                                                     | 5290                |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.6G                                                                                                 | 5500 — 5720         |
|                          | WLAN802.11 n/ac/ax(40M) 5.6G                                                                                                   | 5510 — 5710         |
|                          | WLAN802.11 ac/ax(80M) 5.6G                                                                                                     | 5530 — 5690         |
|                          | WLAN802.11 ac/ax(160M) 5.6G                                                                                                    | 5570                |

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|                          |                                |      |   |      |
|--------------------------|--------------------------------|------|---|------|
| TX Frequency Range (MHz) | WLAN802.11 a/n/ac/ax(20M) 5.8G | 5745 | — | 5825 |
|                          | WLAN802.11 n/ac/ax(40M) 5.8G   | 5755 | — | 5795 |
|                          | WLAN802.11 ac/ax(80M) 5.8G     | 5775 |   |      |
|                          | WLAN U-NII 5                   | 5925 | — | 6425 |
|                          | WLAN U-NII 6                   | 6425 | — | 6525 |
|                          | WLAN U-NII 7                   | 6525 | — | 6875 |
|                          | WLAN U-NII 8                   | 6875 | — | 7125 |
|                          | Bluetooth                      | 2402 | — | 2480 |
| Channel Number (ARFCN)   | WLAN802.11 b/g/n/ax(20M)       | 1    | — | 11   |
|                          | WLAN802.11 n/ax(40M)           | 3    | — | 9    |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.2G | 36   | — | 48   |
|                          | WLAN802.11 n/ac/ax(40M) 5.2G   | 38   | — | 46   |
|                          | WLAN802.11 ac/ax(80M) 5.2G     | 42   |   |      |
|                          | WLAN802.11 ac/ax(160M) 5.2G    | 50   |   |      |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.3G | 52   | — | 64   |
|                          | WLAN802.11 n/ac/ax(40M) 5.3G   | 54   | — | 62   |
|                          | WLAN802.11 ac/ax(80M) 5.3G     | 58   |   |      |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.6G | 100  | — | 144  |
|                          | WLAN802.11 n/ac/ax(40M) 5.6G   | 102  | — | 142  |
|                          | WLAN802.11 ac/ax(80M) 5.6G     | 106  | — | 138  |
|                          | WLAN802.11 ac/ax(160M) 5.6G    | 114  |   |      |
|                          | WLAN802.11 a/n/ac/ax(20M) 5.8G | 149  | — | 165  |
|                          | WLAN802.11 n/ac/ax(40M) 5.8G   | 151  | — | 159  |
|                          | WLAN802.11 ac/ax(80M) 5.8G     | 155  |   |      |
|                          | Bluetooth                      | 0    | — | 78   |

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| Max. SAR (1g) (Unit: W/Kg) |                         |          |          |         |                |
|----------------------------|-------------------------|----------|----------|---------|----------------|
| Antenna                    | Band                    | Measured | Reported | Channel | Position       |
| Main                       | WLAN 802.11b            | 0.24     | 0.26     | 11      | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.2G | 0.83     | 0.89     | 42      | Bottom surface |
|                            | WLAN 802.11ax(80M) 5.3G | 0.66     | 0.70     | 58      | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.6G | 0.98     | 1.06     | 138     | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.8G | 0.91     | 0.99     | 155     | Bottom surface |
| Aux                        | WLAN 802.11b            | 0.32     | 0.34     | 11      | Bottom surface |
|                            | Bluetooth(GFSK)         | 0.02     | 0.02     | 78      | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.2G | 0.65     | 0.71     | 42      | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.3G | 0.71     | 0.77     | 58      | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.6G | 0.98     | 1.07     | 138     | Bottom surface |
|                            | WLAN 802.11ac(80M) 5.8G | 1.00     | 1.08     | 155     | Bottom surface |

| Brand & Mode | Tx Frequency | SAR            | APD                        | PD                         |
|--------------|--------------|----------------|----------------------------|----------------------------|
|              | MHz          | 1g Body (W/kg) | Body (mW/cm <sup>2</sup> ) | psPD (mW/cm <sup>2</sup> ) |
| WiFi 6E      | 5925-7125    | 0.41           | 0.34                       | 0.35                       |

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**WLAN802.11 a/b/g/n/ax/ac(20M/40M)/ac/ax(80M/160M) conducted power table:**

| Band \ Antenna        | SISO |     | MIMO       |
|-----------------------|------|-----|------------|
|                       | Main | Aux | Main + Aux |
| WLAN802.11b           | V    | V   | -          |
| WLAN802.11g           | V    | V   | -          |
| WLAN802.11n(20M)      | V    | V   | V          |
| WLAN802.11n(40M)      | V    | V   | V          |
| WLAN802.11ax(20M)     | V    | V   | V          |
| WLAN802.11ax(40M)     | V    | V   | V          |
| WLAN802.11a           | V    | V   | -          |
| WLAN802.11n(20M) 5G   | V    | V   | V          |
| WLAN802.11n(40M) 5G   | V    | V   | V          |
| WLAN802.11ac(20M) 5G  | V    | V   | V          |
| WLAN802.11ac(40M) 5G  | V    | V   | V          |
| WLAN802.11ac(80M) 5G  | V    | V   | V          |
| WLAN802.11ac(160M) 5G | V    | V   | V          |
| WLAN802.11ax(20M) 5G  | V    | V   | V          |
| WLAN802.11ax(40M) 5G  | V    | V   | V          |
| WLAN802.11ax(80M) 5G  | V    | V   | V          |
| WLAN802.11ax(160M) 5G | V    | V   | V          |
| WLAN802.11n(20M) 6E   | V    | V   | V          |
| WLAN802.11n(40M) 6E   | V    | V   | V          |
| WLAN802.11ac(20M) 6E  | V    | V   | V          |
| WLAN802.11ac(40M) 6E  | V    | V   | V          |
| WLAN802.11ac(80M) 6E  | V    | V   | V          |
| WLAN802.11ac(160M) 6E | V    | V   | V          |
| WLAN802.11ax(20M) 6E  | V    | V   | V          |
| WLAN802.11ax(40M) 6E  | V    | V   | V          |
| WLAN802.11ax(80M) 6E  | V    | V   | V          |
| WLAN802.11ax(160M) 6E | V    | V   | V          |

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## Main

| Main Antenna |                |         |                 |           |                                              |                     |
|--------------|----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode           | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 2450 MHz     | 802.11b        | 1       | 2412            | 1Mbps     | 20.00                                        | 19.83               |
|              |                | 6       | 2437            |           | 20.00                                        | 19.94               |
|              |                | 11      | 2462            |           | 20.00                                        | 19.86               |
|              | 802.11g        | 1       | 2412            | 6Mbps     | 19.00                                        | 19.00               |
|              |                | 6       | 2437            |           | 20.00                                        | 19.63               |
|              |                | 11      | 2462            |           | 18.00                                        | 17.83               |
|              | 802.11n20-HT0  | 1       | 2412            | MCS0      | 19.00                                        | 18.58               |
|              |                | 6       | 2437            |           | 20.00                                        | 19.83               |
|              |                | 11      | 2462            |           | 18.00                                        | 18.00               |
|              | 802.11ax20-HE0 | 1       | 2412            | MCS0      | 19.00                                        | 18.77               |
|              |                | 6       | 2437            |           | 20.00                                        | 19.68               |
|              |                | 11      | 2462            |           | 18.00                                        | 17.27               |
|              | 802.11n40-HT0  | 3       | 2422            | MCS0      | 16.75                                        | 16.34               |
|              |                | 6       | 2437            |           | 18.00                                        | 16.77               |
|              |                | 9       | 2452            |           | 17.25                                        | 15.66               |
|              | 802.11ax40-HE0 | 3       | 2422            | MCS0      | 16.75                                        | 16.19               |
|              |                | 6       | 2437            |           | 18.00                                        | 16.56               |
|              |                | 9       | 2452            |           | 17.25                                        | 15.61               |

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| Main Antenna  |                  |         |                 |           |                                              |                     |
|---------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band          | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5.15-5.25 GHz | 802.11a          | 36      | 5180            | 6Mbps     | 18.00                                        | 17.81               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.81               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.83               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.69               |
|               | 802.11n20-HT0    | 36      | 5180            | MCS0      | 18.00                                        | 17.80               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.65               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.58               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.84               |
|               | 802.11ac20-VHT0  | 36      | 5180            | MCS0      | 18.00                                        | 17.76               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.63               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.48               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.75               |
|               | 802.11ax20-HE0   | 36      | 5180            | MCS0      | 18.00                                        | 17.84               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.63               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.61               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.65               |
|               | 802.11n40-HT0    | 38      | 5190            | MCS0      | 18.00                                        | 17.53               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.67               |
|               | 802.11ac40-VHT0  | 38      | 5190            | MCS0      | 18.00                                        | 17.44               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.65               |
|               | 802.11ax40-HE0   | 38      | 5190            | MCS0      | 16.75                                        | 16.72               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.63               |
|               | 802.11ac80-VHT0  | 42      | 5210            | MCS0      | 18.00                                        | 17.98               |
|               | 802.11ax80-HE0   | 42      | 5210            | MCS0      | 18.00                                        | 17.63               |
|               | 802.11ac160-VHT0 | 50      | 5250            | MCS0      | 15.50                                        | 15.35               |
|               | 802.11ax160-HE0  | 50      | 5250            | MCS0      | 14.00                                        | 14.00               |

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|---------------|-----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band          | Mode            | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5.25-5.35 GHz | 802.11a         | 52      | 5260            | 6Mbps     | 18.00                                        | 17.73               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.69               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.77               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.71               |
|               | 802.11n20-HT0   | 52      | 5260            | MCS0      | 18.00                                        | 17.82               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.84               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.73               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.79               |
|               | 802.11ac20-VHT0 | 52      | 5260            | MCS0      | 18.00                                        | 17.80               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.75               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.70               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.71               |
|               | 802.11ax20-HE0  | 52      | 5260            | MCS0      | 18.00                                        | 17.67               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.58               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.52               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.88               |
|               | 802.11n40-HT0   | 54      | 5270            | MCS0      | 18.00                                        | 17.74               |
|               |                 | 62      | 5310            |           | 17.50                                        | 17.08               |
|               | 802.11ac40-VHT0 | 54      | 5270            | MCS0      | 18.00                                        | 17.69               |
|               |                 | 62      | 5310            |           | 17.50                                        | 17.08               |
|               | 802.11ax40-HE0  | 54      | 5270            | MCS0      | 18.00                                        | 17.59               |
|               |                 | 62      | 5310            |           | 16.75                                        | 16.69               |
|               | 802.11ac80-VHT0 | 58      | 5290            | MCS0      | 17.50                                        | 17.50               |
|               | 802.11ax80-HE0  | 58      | 5290            | MCS0      | 18.00                                        | 17.91               |

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|--------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5600 MHz     | 802.11a          | 100     | 5500            | 6Mbps     | 18.00                                        | 17.68               |
|              |                  | 104     | 5520            |           | 18.00                                        | 17.73               |
|              |                  | 116     | 5580            |           | 18.00                                        | 17.66               |
|              |                  | 120     | 5600            |           | 18.00                                        | 17.90               |
|              |                  | 136     | 5680            |           | 18.00                                        | 17.84               |
|              |                  | 140     | 5700            |           | 18.00                                        | 17.82               |
|              |                  | 144     | 5720            |           | 18.00                                        | 17.78               |
|              | 802.11n20-HT0    | 100     | 5500            | MCS0      | 18.00                                        | 17.68               |
|              |                  | 104     | 5520            |           | 18.00                                        | 17.71               |
|              |                  | 116     | 5580            |           | 18.00                                        | 17.62               |
|              |                  | 120     | 5600            |           | 18.00                                        | 17.77               |
|              |                  | 136     | 5680            |           | 18.00                                        | 17.75               |
|              |                  | 140     | 5700            |           | 18.00                                        | 17.78               |
|              |                  | 144     | 5720            |           | 18.00                                        | 17.64               |
|              | 802.11ac20-VHT0  | 100     | 5500            | MCS0      | 18.00                                        | 17.68               |
|              |                  | 104     | 5520            |           | 18.00                                        | 17.64               |
|              |                  | 116     | 5580            |           | 18.00                                        | 17.60               |
|              |                  | 120     | 5600            |           | 18.00                                        | 17.69               |
|              |                  | 136     | 5680            |           | 18.00                                        | 17.74               |
|              |                  | 140     | 5700            |           | 18.00                                        | 17.70               |
|              |                  | 144     | 5720            |           | 18.00                                        | 17.58               |
|              | 802.11ax20-HE0   | 100     | 5500            | MCS0      | 18.00                                        | 17.82               |
|              |                  | 104     | 5520            |           | 18.00                                        | 17.80               |
|              |                  | 116     | 5580            |           | 18.00                                        | 17.66               |
|              |                  | 120     | 5600            |           | 18.00                                        | 17.63               |
|              |                  | 136     | 5680            |           | 18.00                                        | 17.82               |
|              |                  | 140     | 5700            |           | 18.00                                        | 17.80               |
|              |                  | 144     | 5720            |           | 18.00                                        | 17.68               |
|              | 802.11n40-HT0    | 102     | 5510            | MCS0      | 18.00                                        | 17.69               |
|              |                  | 110     | 5550            |           | 18.00                                        | 17.84               |
|              |                  | 118     | 5590            |           | 18.00                                        | 17.82               |
|              |                  | 134     | 5670            |           | 18.00                                        | 17.83               |
|              |                  | 142     | 5710            |           | 18.00                                        | 17.65               |
|              | 802.11ac40-VHT0  | 102     | 5510            | MCS0      | 18.00                                        | 17.69               |
|              |                  | 110     | 5550            |           | 18.00                                        | 17.84               |
|              |                  | 118     | 5590            |           | 18.00                                        | 17.73               |
|              |                  | 134     | 5670            |           | 18.00                                        | 17.77               |
|              |                  | 142     | 5710            |           | 18.00                                        | 17.61               |
|              | 802.11ax40-HE0   | 102     | 5510            | MCS0      | 18.00                                        | 17.57               |
|              |                  | 110     | 5550            |           | 18.00                                        | 17.71               |
|              |                  | 118     | 5590            |           | 18.00                                        | 17.55               |
|              |                  | 134     | 5670            |           | 18.00                                        | 17.82               |
|              |                  | 142     | 5710            |           | 18.00                                        | 17.78               |
|              | 802.11ac80-VHT0  | 106     | 5530            | MCS0      | 18.00                                        | 17.99               |
|              |                  | 122     | 5610            |           | 18.00                                        | 18.00               |
|              |                  | 138     | 5690            |           | 18.00                                        | 17.97               |
|              | 802.11ax80-HE0   | 106     | 5530            | MCS0      | 18.00                                        | 17.77               |
|              |                  | 122     | 5610            |           | 18.00                                        | 17.63               |
|              |                  | 138     | 5690            |           | 18.00                                        | 17.56               |
|              | 802.11ac160-VHT0 | 114     | 5570            | MCS0      | 15.50                                        | 15.41               |
|              | 802.11ax160-HE0  | 114     | 5570            | MCS0      | 15.50                                        | 15.18               |

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|--------------|-----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode            | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5800 MHz     | 802.11a         | 149     | 5745            | 6Mbps     | 18.00                                        | 17.77               |
|              |                 | 157     | 5785            |           | 18.00                                        | 17.81               |
|              |                 | 165     | 5825            |           | 18.00                                        | 17.82               |
|              | 802.11n20-HT0   | 149     | 5745            | MCS0      | 18.00                                        | 17.66               |
|              |                 | 157     | 5785            |           | 18.00                                        | 17.69               |
|              |                 | 165     | 5825            |           | 18.00                                        | 17.74               |
|              | 802.11ac20-VHT0 | 149     | 5745            | MCS0      | 18.00                                        | 17.64               |
|              |                 | 157     | 5785            |           | 18.00                                        | 17.69               |
|              |                 | 165     | 5825            |           | 18.00                                        | 17.66               |
|              | 802.11ax20-HE0  | 149     | 5745            | MCS0      | 18.00                                        | 17.77               |
|              |                 | 157     | 5785            |           | 18.00                                        | 17.58               |
|              |                 | 165     | 5825            |           | 18.00                                        | 17.56               |
|              | 802.11n40-HT0   | 151     | 5755            | MCS0      | 18.00                                        | 17.69               |
|              |                 | 159     | 5795            |           | 18.00                                        | 17.67               |
|              | 802.11ac40-VHT0 | 151     | 5755            | MCS0      | 18.00                                        | 17.65               |
|              |                 | 159     | 5795            |           | 18.00                                        | 17.59               |
|              | 802.11ax40-HE0  | 151     | 5755            | MCS0      | 18.00                                        | 17.66               |
|              |                 | 159     | 5795            |           | 18.00                                        | 17.71               |
|              | 802.11ac80-VHT0 | 155     | 5775            | MCS0      | 18.00                                        | 17.97               |
|              | 802.11ax80-HE0  | 155     | 5775            | MCS0      | 18.00                                        | 17.91               |

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## Aux

| Aux Antenna |                |         |                 |           |                                              |                     |
|-------------|----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode           | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 2450 MHz    | 802.11b        | 1       | 2412            | 1Mbps     | 20.00                                        | 19.92               |
|             |                | 6       | 2437            |           | 20.00                                        | 19.96               |
|             |                | 11      | 2462            |           | 20.00                                        | 19.87               |
|             | 802.11g        | 1       | 2412            | 6Mbps     | 19.25                                        | 19.25               |
|             |                | 6       | 2437            |           | 20.00                                        | 19.92               |
|             |                | 11      | 2462            |           | 19.00                                        | 18.94               |
|             | 802.11n20-HT0  | 1       | 2412            | MCS0      | 19.25                                        | 18.92               |
|             |                | 6       | 2437            |           | 20.00                                        | 19.91               |
|             |                | 11      | 2462            |           | 19.00                                        | 18.33               |
|             | 802.11ax20-HE0 | 1       | 2412            | MCS0      | 19.25                                        | 19.02               |
|             |                | 6       | 2437            |           | 20.00                                        | 19.70               |
|             |                | 11      | 2462            |           | 19.00                                        | 17.74               |
|             | 802.11n40-HT0  | 3       | 2422            | MCS0      | 17.75                                        | 16.64               |
|             |                | 6       | 2437            |           | 18.25                                        | 17.30               |
|             |                | 9       | 2452            |           | 17.50                                        | 16.25               |
|             | 802.11ax40-HE0 | 3       | 2422            | MCS0      | 17.75                                        | 17.62               |
|             |                | 6       | 2437            |           | 18.25                                        | 16.79               |
|             |                | 9       | 2452            |           | 17.50                                        | 16.18               |

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| Aux Antenna   |                  |         |                 |           |                                              |                     |
|---------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band          | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5.15-5.25 GHz | 802.11a          | 36      | 5180            | 6Mbps     | 18.00                                        | 17.95               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.95               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.92               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.94               |
|               | 802.11n20-HT0    | 36      | 5180            | MCS0      | 18.00                                        | 17.87               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.80               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.74               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.85               |
|               | 802.11ac20-VHT0  | 36      | 5180            | MCS0      | 18.00                                        | 17.83               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.75               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.73               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.83               |
|               | 802.11ax20-HE0   | 36      | 5180            | MCS0      | 18.00                                        | 17.86               |
|               |                  | 40      | 5200            |           | 18.00                                        | 17.79               |
|               |                  | 44      | 5220            |           | 18.00                                        | 17.76               |
|               |                  | 48      | 5240            |           | 18.00                                        | 17.73               |
|               | 802.11n40-HT0    | 38      | 5190            | MCS0      | 18.00                                        | 17.67               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.87               |
|               | 802.11ac40-VHT0  | 38      | 5190            | MCS0      | 18.00                                        | 17.65               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.78               |
|               | 802.11ax40-HE0   | 38      | 5190            | MCS0      | 18.00                                        | 17.63               |
|               |                  | 46      | 5230            |           | 18.00                                        | 17.79               |
|               | 802.11ac80-VHT0  | 42      | 5210            | MCS0      | 18.00                                        | 17.98               |
|               | 802.11ax80-HE0   | 42      | 5210            | MCS0      | 18.00                                        | 17.82               |
|               | 802.11ac160-VHT0 | 50      | 5250            | MCS0      | 16.00                                        | 15.72               |
|               | 802.11ax160-HE0  | 50      | 5250            | MCS0      | 15.00                                        | 15.00               |

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| Aux Antenna   |                 |         |                 |           |                                              |                     |
|---------------|-----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band          | Mode            | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5.25-5.35 GHz | 802.11a         | 52      | 5260            | 6Mbps     | 18.00                                        | 17.93               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.92               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.88               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.86               |
|               | 802.11n20-HT0   | 52      | 5260            | MCS0      | 18.00                                        | 17.83               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.85               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.82               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.80               |
|               | 802.11ac20-VHT0 | 52      | 5260            | MCS0      | 18.00                                        | 17.76               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.85               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.81               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.74               |
|               | 802.11ax20-HE0  | 52      | 5260            | MCS0      | 18.00                                        | 17.76               |
|               |                 | 56      | 5280            |           | 18.00                                        | 17.82               |
|               |                 | 60      | 5300            |           | 18.00                                        | 17.91               |
|               |                 | 64      | 5320            |           | 18.00                                        | 17.90               |
|               | 802.11n40-HT0   | 54      | 5270            | MCS0      | 18.00                                        | 17.85               |
|               |                 | 62      | 5310            |           | 18.00                                        | 17.78               |
|               | 802.11ac40-VHT0 | 54      | 5270            | MCS0      | 18.00                                        | 17.78               |
|               |                 | 62      | 5310            |           | 18.00                                        | 17.74               |
|               | 802.11ax40-HE0  | 54      | 5270            | MCS0      | 18.00                                        | 17.77               |
|               |                 | 62      | 5310            |           | 18.00                                        | 17.73               |
|               | 802.11ac80-VHT0 | 58      | 5290            | MCS0      | 18.00                                        | 17.96               |
|               | 802.11ax80-HE0  | 58      | 5290            | MCS0      | 18.00                                        | 17.53               |

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|-------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5600 MHz    | 802.11a          | 100     | 5500            | 6Mbps     | 18.00                                        | 17.74               |
|             |                  | 104     | 5520            |           | 18.00                                        | 17.79               |
|             |                  | 116     | 5580            |           | 18.00                                        | 17.82               |
|             |                  | 120     | 5600            |           | 18.00                                        | 17.92               |
|             |                  | 136     | 5680            |           | 18.00                                        | 17.82               |
|             |                  | 140     | 5700            |           | 18.00                                        | 17.92               |
|             |                  | 144     | 5720            |           | 18.00                                        | 17.84               |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11n20-HT0    | 100     | 5500            | MCS0      | 18.00                                        | 17.91               |
|             |                  | 104     | 5520            |           | 18.00                                        | 17.94               |
|             |                  | 116     | 5580            |           | 18.00                                        | 17.90               |
|             |                  | 120     | 5600            |           | 18.00                                        | 17.85               |
|             |                  | 136     | 5680            |           | 18.00                                        | 17.86               |
|             |                  | 140     | 5700            |           | 18.00                                        | 17.83               |
|             |                  | 144     | 5720            |           | 18.00                                        | 17.84               |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ac20-VHT0  | 100     | 5500            | MCS0      | 18.00                                        | 17.90               |
|             |                  | 104     | 5520            |           | 18.00                                        | 17.94               |
|             |                  | 116     | 5580            |           | 18.00                                        | 17.89               |
|             |                  | 120     | 5600            |           | 18.00                                        | 17.82               |
|             |                  | 136     | 5680            |           | 18.00                                        | 17.84               |
|             |                  | 140     | 5700            |           | 18.00                                        | 17.83               |
|             |                  | 144     | 5720            |           | 18.00                                        | 17.81               |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ax20-HE0   | 100     | 5500            | MCS0      | 18.00                                        | 17.85               |
|             |                  | 104     | 5520            |           | 18.00                                        | 17.83               |
|             |                  | 116     | 5580            |           | 18.00                                        | 17.88               |
|             |                  | 120     | 5600            |           | 18.00                                        | 17.92               |
|             |                  | 136     | 5680            |           | 18.00                                        | 17.85               |
|             |                  | 140     | 5700            |           | 18.00                                        | 17.90               |
|             |                  | 144     | 5720            |           | 18.00                                        | 17.92               |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11n40-HT0    | 102     | 5510            | MCS0      | 18.00                                        | 17.87               |
|             |                  | 110     | 5550            |           | 18.00                                        | 17.89               |
|             |                  | 118     | 5590            |           | 18.00                                        | 17.83               |
|             |                  | 134     | 5670            |           | 18.00                                        | 17.85               |
|             |                  | 142     | 5710            |           | 18.00                                        | 17.83               |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ac40-VHT0  | 102     | 5510            | MCS0      | 18.00                                        | 17.79               |
|             |                  | 110     | 5550            |           | 18.00                                        | 17.82               |
|             |                  | 118     | 5590            |           | 18.00                                        | 17.77               |
|             |                  | 134     | 5670            |           | 18.00                                        | 17.78               |
|             |                  | 142     | 5710            |           | 18.00                                        | 17.81               |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ax40-HE0   | 102     | 5510            | MCS0      | 18.00                                        | 17.71               |
|             |                  | 110     | 5550            |           | 18.00                                        | 17.65               |
|             |                  | 118     | 5590            |           | 18.00                                        | 17.72               |
|             |                  | 134     | 5670            |           | 18.00                                        | 17.94               |
|             |                  | 142     | 5710            |           | 18.00                                        | 17.80               |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ac80-VHT0  | 106     | 5530            | MCS0      | 18.00                                        | 17.97               |
|             |                  | 122     | 5610            |           | 18.00                                        | 17.92               |
|             |                  | 138     | 5690            |           | 18.00                                        | 17.99               |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ax80-HE0   | 106     | 5530            | MCS0      | 18.00                                        | 17.86               |
|             |                  | 122     | 5610            |           | 18.00                                        | 17.87               |
|             |                  | 138     | 5690            |           | 18.00                                        | 17.77               |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             |                  |         |                 |           |                                              |                     |
|             | 802.11ac160-VHT0 | 114     | 5570            | MCS0      | 16.75                                        | 16.12               |
|             | 802.11ax160-HE0  | 114     | 5570            | MCS0      | 16.75                                        | 16.54               |

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|-------------|-----------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode            | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| 5800 MHz    | 802.11a         | 149     | 5745            | 6Mbps     | 18.00                                        | 17.96               |
|             |                 | 157     | 5785            |           | 18.00                                        | 17.96               |
|             |                 | 165     | 5825            |           | 18.00                                        | 17.88               |
|             | 802.11n20-HT0   | 149     | 5745            | MCS0      | 18.00                                        | 17.87               |
|             |                 | 157     | 5785            |           | 18.00                                        | 17.86               |
|             |                 | 165     | 5825            |           | 18.00                                        | 17.77               |
|             | 802.11ac20-VHT0 | 149     | 5745            | MCS0      | 18.00                                        | 17.84               |
|             |                 | 157     | 5785            |           | 18.00                                        | 17.80               |
|             |                 | 165     | 5825            |           | 18.00                                        | 17.72               |
|             | 802.11ax20-HE0  | 149     | 5745            | MCS0      | 18.00                                        | 17.88               |
|             |                 | 157     | 5785            |           | 18.00                                        | 17.82               |
|             |                 | 165     | 5825            |           | 18.00                                        | 17.80               |
|             | 802.11n40-HT0   | 151     | 5755            | MCS0      | 18.00                                        | 17.88               |
|             |                 | 159     | 5795            |           | 18.00                                        | 17.90               |
|             | 802.11ac40-VHT0 | 151     | 5755            | MCS0      | 18.00                                        | 17.81               |
|             |                 | 159     | 5795            |           | 18.00                                        | 17.89               |
|             | 802.11ax40-HE0  | 151     | 5755            | MCS0      | 18.00                                        | 17.82               |
|             |                 | 159     | 5795            |           | 18.00                                        | 17.73               |
|             | 802.11ac80-VHT0 | 155     | 5775            | MCS0      | 18.00                                        | 17.99               |
|             | 802.11ax80-HE0  | 155     | 5775            | MCS0      | 18.00                                        | 17.98               |

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### WIFI 6E power:

| Main Antenna |                  |         |                 |           |                                              |                     |
|--------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-5      | 802.11a          | 1       | 5955            | 6Mbps     | 6.00                                         | 4.57                |
|              |                  | 45      | 6175            |           | 6.00                                         | 4.02                |
|              |                  | 93      | 6415            |           | 6.00                                         | 4.09                |
|              | 802.11n20-HT0    | 1       | 5955            | MCS0      | 6.00                                         | 4.80                |
|              |                  | 45      | 6175            |           | 6.00                                         | 4.31                |
|              |                  | 93      | 6415            |           | 6.00                                         | 4.32                |
|              | 802.11ac20-VHT0  | 1       | 5955            | MCS0      | 6.00                                         | 4.71                |
|              |                  | 45      | 6175            |           | 6.00                                         | 4.22                |
|              |                  | 93      | 6415            |           | 6.00                                         | 4.25                |
|              | 802.11ax20-HE0   | 1       | 5955            | MCS0      | 6.00                                         | 4.80                |
|              |                  | 45      | 6175            |           | 6.00                                         | 4.38                |
|              |                  | 93      | 6415            |           | 6.00                                         | 4.90                |
|              | 802.11n40-HT0    | 3       | 5985            | MCS0      | 9.00                                         | 7.43                |
|              |                  | 43      | 6165            |           | 9.00                                         | 7.38                |
|              |                  | 91      | 6405            |           | 9.00                                         | 7.37                |
|              | 802.11ac40-VHT0  | 3       | 5985            | MCS0      | 9.00                                         | 7.37                |
|              |                  | 43      | 6165            |           | 9.00                                         | 7.32                |
|              |                  | 91      | 6405            |           | 9.00                                         | 7.33                |
|              | 802.11ax40-HE0   | 3       | 5985            | MCS0      | 9.00                                         | 7.72                |
|              |                  | 43      | 6165            |           | 9.00                                         | 7.12                |
|              |                  | 91      | 6405            |           | 9.00                                         | 7.65                |
|              | 802.11ac80-VHT0  | 7       | 5985            | MCS0      | 12.00                                        | 10.11               |
|              |                  | 39      | 6145            |           | 12.00                                        | 10.17               |
|              |                  | 87      | 6385            |           | 12.00                                        | 10.41               |
|              | 802.11ax80-HE0   | 7       | 5985            | MCS0      | 12.00                                        | 10.07               |
|              |                  | 39      | 6145            |           | 12.00                                        | 10.49               |
|              |                  | 87      | 6385            |           | 12.00                                        | 10.05               |
|              | 802.11ac160-VHT0 | 15      | 6025            | MCS0      | 13.00                                        | 12.80               |
|              |                  | 47      | 6185            |           | 13.00                                        | 12.88               |
|              |                  | 79      | 6345            |           | 13.00                                        | 12.76               |
|              | 802.11ax160-HE0  | 15      | 6025            | MCS0      | 13.00                                        | 12.80               |
|              |                  | 47      | 6185            |           | 13.00                                        | 12.91               |
|              |                  | 79      | 6345            |           | 13.00                                        | 12.55               |

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| Main Antenna |                  |         |                 |           |                                              |                     |
|--------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-6      | 802.11a          | 97      | 6435            | 6Mbps     | 6.00                                         | 4.32                |
|              |                  | 105     | 6475            |           | 6.00                                         | 4.34                |
|              |                  | 113     | 6515            |           | 6.00                                         | 4.36                |
|              | 802.11n20-HT0    | 97      | 6435            | MCS0      | 6.00                                         | 4.17                |
|              |                  | 105     | 6475            |           | 6.00                                         | 4.16                |
|              |                  | 113     | 6515            |           | 6.00                                         | 4.28                |
|              | 802.11ac20-VHT0  | 97      | 6435            | MCS0      | 6.00                                         | 4.10                |
|              |                  | 105     | 6475            |           | 6.00                                         | 4.12                |
|              |                  | 113     | 6515            |           | 6.00                                         | 4.28                |
|              | 802.11ax20-HE0   | 97      | 6435            | MCS0      | 6.00                                         | 4.79                |
|              |                  | 105     | 6475            |           | 6.00                                         | 4.32                |
|              |                  | 113     | 6515            |           | 6.00                                         | 4.37                |
|              | 802.11n40-HT0    | 99      | 6445            | MCS0      | 9.00                                         | 7.24                |
|              |                  | 107     | 6485            |           | 9.00                                         | 7.35                |
|              | 802.11ac40-VHT0  | 99      | 6445            | MCS0      | 9.00                                         | 7.22                |
|              |                  | 107     | 6485            |           | 9.00                                         | 7.32                |
|              | 802.11ax40-HE0   | 99      | 6445            | MCS0      | 9.00                                         | 7.62                |
|              |                  | 107     | 6485            |           | 9.00                                         | 7.72                |
|              | 802.11ac80-VHT0  | 103     | 6465            | MCS0      | 12.00                                        | 10.57               |
|              |                  | 119     | 6545            |           | 12.00                                        | 10.32               |
|              | 802.11ax80-HE0   | 103     | 6465            | MCS0      | 12.00                                        | 10.06               |
|              |                  | 119     | 6545            |           | 12.00                                        | 10.11               |
|              | 802.11ac160-VHT0 | 111     | 6505            | MCS0      | 13.00                                        | 12.73               |
|              | 802.11ax160-HE0  | 111     | 6505            | MCS0      | 13.00                                        | 12.52               |

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| Main Antenna |                  |         |                 |           |                                              |                     |
|--------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-7      | 802.11a          | 117     | 6535            | 6Mbps     | 6.00                                         | 4.53                |
|              |                  | 149     | 6695            |           | 6.00                                         | 4.46                |
|              |                  | 181     | 6855            |           | 6.00                                         | 4.29                |
|              | 802.11n20-HT0    | 117     | 6535            | MCS0      | 6.00                                         | 4.31                |
|              |                  | 149     | 6695            |           | 6.00                                         | 4.17                |
|              |                  | 181     | 6855            |           | 6.00                                         | 4.05                |
|              | 802.11ac20-VHT0  | 117     | 6535            | MCS0      | 6.00                                         | 4.26                |
|              |                  | 149     | 6695            |           | 6.00                                         | 4.11                |
|              |                  | 181     | 6855            |           | 6.00                                         | 4.04                |
|              | 802.11ax20-HE0   | 117     | 6535            | MCS0      | 6.00                                         | 4.49                |
|              |                  | 149     | 6695            |           | 6.00                                         | 4.27                |
|              |                  | 181     | 6855            |           | 6.00                                         | 4.51                |
|              | 802.11n40-HT0    | 115     | 6525            | MCS0      | 9.00                                         | 7.36                |
|              |                  | 147     | 6685            |           | 9.00                                         | 7.19                |
|              |                  | 179     | 6845            |           | 9.00                                         | 7.42                |
|              | 802.11ac40-VHT0  | 115     | 6525            | MCS0      | 9.00                                         | 7.27                |
|              |                  | 147     | 6685            |           | 9.00                                         | 7.16                |
|              |                  | 179     | 6845            |           | 9.00                                         | 7.40                |
|              | 802.11ax40-HE0   | 115     | 6525            | MCS0      | 9.00                                         | 7.61                |
|              |                  | 147     | 6685            |           | 9.00                                         | 7.76                |
|              |                  | 179     | 6845            |           | 9.00                                         | 7.72                |
|              | 802.11ac80-VHT0  | 135     | 6625            | MCS0      | 12.00                                        | 10.61               |
|              |                  | 151     | 6705            |           | 12.00                                        | 11.91               |
|              |                  | 167     | 6785            |           | 12.00                                        | 10.35               |
|              | 802.11ax80-HE0   | 135     | 6625            | MCS0      | 12.00                                        | 10.96               |
|              |                  | 151     | 6705            |           | 12.00                                        | 11.87               |
|              |                  | 167     | 6785            |           | 12.00                                        | 10.59               |
|              | 802.11ac160-VHT0 | 143     | 6665            | MCS0      | 13.00                                        | 12.78               |
|              |                  | 175     | 6825            |           | 13.00                                        | 12.98               |
|              | 802.11ax160-HE0  | 143     | 6665            | MCS0      | 13.00                                        | 12.51               |
|              |                  | 175     | 6825            |           | 13.00                                        | 12.85               |

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| Main Antenna |                  |         |                 |           |                                              |                     |
|--------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band         | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-8      | 802.11a          | 185     | 6875            | 6Mbps     | 6.00                                         | 4.41                |
|              |                  | 209     | 6995            |           | 6.00                                         | 4.14                |
|              | 802.11n20-HT0    | 185     | 6875            | MCS0      | 6.00                                         | 4.54                |
|              |                  | 209     | 6995            |           | 6.00                                         | 4.14                |
|              | 802.11ac20-VHT0  | 185     | 6875            | MCS0      | 6.00                                         | 4.52                |
|              |                  | 209     | 6995            |           | 6.00                                         | 4.11                |
|              | 802.11ax20-HE0   | 185     | 6875            | MCS0      | 6.00                                         | 4.63                |
|              |                  | 209     | 6995            |           | 6.00                                         | 4.28                |
|              | 802.11n40-HT0    | 187     | 6885            | MCS0      | 9.00                                         | 7.59                |
|              |                  | 227     | 7085            |           | 9.00                                         | 7.68                |
|              | 802.11ac40-VHT0  | 187     | 6885            | MCS0      | 9.00                                         | 7.56                |
|              |                  | 227     | 7085            |           | 9.00                                         | 7.63                |
|              | 802.11ax40-HE0   | 187     | 6885            | MCS0      | 9.00                                         | 7.55                |
|              |                  | 227     | 7085            |           | 9.00                                         | 7.94                |
|              | 802.11ac80-VHT0  | 183     | 6865            | MCS0      | 12.00                                        | 10.15               |
|              |                  | 199     | 6945            |           | 12.00                                        | 10.17               |
|              |                  | 215     | 7025            |           | 12.00                                        | 10.75               |
|              | 802.11ax80-HE0   | 183     | 6865            | MCS0      | 12.00                                        | 10.05               |
|              |                  | 199     | 6945            |           | 12.00                                        | 10.83               |
|              |                  | 215     | 7025            |           | 12.00                                        | 11.03               |
|              | 802.11ac160-VHT0 | 207     | 6985            | MCS0      | 13.00                                        | 12.63               |
|              | 802.11ax160-HE0  | 207     | 6985            | MCS0      | 13.00                                        | 12.58               |

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|-------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-5     | 802.11a          | 1       | 5955            | 6Mbps     | 6.00                                         | 4.68                |
|             |                  | 45      | 6175            |           | 6.00                                         | 4.36                |
|             |                  | 93      | 6415            |           | 6.00                                         | 4.29                |
|             | 802.11n20-HT0    | 1       | 5955            | MCS0      | 6.00                                         | 4.91                |
|             |                  | 45      | 6175            |           | 6.00                                         | 4.45                |
|             |                  | 93      | 6415            |           | 6.00                                         | 4.36                |
|             | 802.11ac20-VHT0  | 1       | 5955            | MCS0      | 6.00                                         | 4.90                |
|             |                  | 45      | 6175            |           | 6.00                                         | 4.35                |
|             |                  | 93      | 6415            |           | 6.00                                         | 4.35                |
|             | 802.11ax20-HE0   | 1       | 5955            | MCS0      | 6.00                                         | 4.82                |
|             |                  | 45      | 6175            |           | 6.00                                         | 4.49                |
|             |                  | 93      | 6415            |           | 6.00                                         | 4.92                |
|             | 802.11n40-HT0    | 3       | 5985            | MCS0      | 9.00                                         | 7.45                |
|             |                  | 43      | 6165            |           | 9.00                                         | 8.00                |
|             |                  | 91      | 6405            |           | 9.00                                         | 7.53                |
|             | 802.11ac40-VHT0  | 3       | 5985            | MCS0      | 9.00                                         | 7.45                |
|             |                  | 43      | 6165            |           | 9.00                                         | 7.95                |
|             |                  | 91      | 6405            |           | 9.00                                         | 7.52                |
|             | 802.11ax40-HE0   | 3       | 5985            | MCS0      | 9.00                                         | 7.75                |
|             |                  | 43      | 6165            |           | 9.00                                         | 7.80                |
|             |                  | 91      | 6405            |           | 9.00                                         | 8.13                |
|             | 802.11ac80-VHT0  | 7       | 5985            | MCS0      | 12.00                                        | 10.67               |
|             |                  | 39      | 6145            |           | 12.00                                        | 10.69               |
|             |                  | 87      | 6385            |           | 12.00                                        | 10.93               |
|             | 802.11ax80-HE0   | 7       | 5985            | MCS0      | 12.00                                        | 10.99               |
|             |                  | 39      | 6145            |           | 12.00                                        | 10.96               |
|             |                  | 87      | 6385            |           | 12.00                                        | 10.75               |
|             | 802.11ac160-VHT0 | 15      | 6025            | MCS0      | 13.00                                        | 12.86               |
|             |                  | 47      | 6185            |           | 13.00                                        | 12.98               |
|             |                  | 79      | 6345            |           | 13.00                                        | 12.84               |
|             | 802.11ax160-HE0  | 15      | 6025            | MCS0      | 13.00                                        | 12.82               |
|             |                  | 47      | 6185            |           | 13.00                                        | 12.99               |
|             |                  | 79      | 6345            |           | 13.00                                        | 12.74               |

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|-------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-6     | 802.11a          | 97      | 6435            | 6Mbps     | 6.00                                         | 4.72                |
|             |                  | 105     | 6475            |           | 6.00                                         | 4.62                |
|             |                  | 113     | 6515            |           | 6.00                                         | 4.56                |
|             | 802.11n20-HT0    | 97      | 6435            | MCS0      | 6.00                                         | 4.35                |
|             |                  | 105     | 6475            |           | 6.00                                         | 4.68                |
|             |                  | 113     | 6515            |           | 6.00                                         | 4.63                |
|             | 802.11ac20-VHT0  | 97      | 6435            | MCS0      | 6.00                                         | 4.34                |
|             |                  | 105     | 6475            |           | 6.00                                         | 4.61                |
|             |                  | 113     | 6515            |           | 6.00                                         | 4.62                |
|             | 802.11ax20-HE0   | 97      | 6435            | MCS0      | 6.00                                         | 4.84                |
|             |                  | 105     | 6475            |           | 6.00                                         | 4.82                |
|             |                  | 113     | 6515            |           | 6.00                                         | 4.73                |
|             | 802.11n40-HT0    | 99      | 6445            | MCS0      | 9.00                                         | 7.38                |
|             |                  | 107     | 6485            |           | 9.00                                         | 7.38                |
|             | 802.11ac40-VHT0  | 99      | 6445            | MCS0      | 9.00                                         | 7.28                |
|             |                  | 107     | 6485            |           | 9.00                                         | 7.31                |
|             | 802.11ax40-HE0   | 99      | 6445            | MCS0      | 9.00                                         | 7.93                |
|             |                  | 107     | 6485            |           | 9.00                                         | 7.77                |
|             | 802.11ac80-VHT0  | 103     | 6465            | MCS0      | 12.00                                        | 10.65               |
|             |                  | 119     | 6545            |           | 12.00                                        | 10.91               |
|             | 802.11ax80-HE0   | 103     | 6465            | MCS0      | 12.00                                        | 10.89               |
|             |                  | 119     | 6545            |           | 12.00                                        | 10.68               |
|             | 802.11ac160-VHT0 | 111     | 6505            | MCS0      | 13.00                                        | 12.76               |
|             | 802.11ax160-HE0  | 111     | 6505            | MCS0      | 13.00                                        | 12.68               |

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| Aux Antenna |                  |         |                 |           |                                              |                     |
|-------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-7     | 802.11a          | 117     | 6535            | 6Mbps     | 6.00                                         | 4.56                |
|             |                  | 149     | 6695            |           | 6.00                                         | 4.40                |
|             |                  | 181     | 6855            |           | 6.00                                         | 4.60                |
|             | 802.11n20-HT0    | 117     | 6535            | MCS0      | 6.00                                         | 4.64                |
|             |                  | 149     | 6695            |           | 6.00                                         | 4.61                |
|             |                  | 181     | 6855            |           | 6.00                                         | 4.69                |
|             | 802.11ac20-VHT0  | 117     | 6535            | MCS0      | 6.00                                         | 4.60                |
|             |                  | 149     | 6695            |           | 6.00                                         | 4.60                |
|             |                  | 181     | 6855            |           | 6.00                                         | 4.69                |
|             | 802.11ax20-HE0   | 117     | 6535            | MCS0      | 6.00                                         | 4.75                |
|             |                  | 149     | 6695            |           | 6.00                                         | 4.17                |
|             |                  | 181     | 6855            |           | 6.00                                         | 4.52                |
|             | 802.11n40-HT0    | 115     | 6525            | MCS0      | 9.00                                         | 7.81                |
|             |                  | 147     | 6685            |           | 9.00                                         | 7.76                |
|             |                  | 179     | 6845            |           | 9.00                                         | 7.52                |
|             | 802.11ac40-VHT0  | 115     | 6525            | MCS0      | 9.00                                         | 7.71                |
|             |                  | 147     | 6685            |           | 9.00                                         | 7.68                |
|             |                  | 179     | 6845            |           | 9.00                                         | 7.47                |
|             | 802.11ax40-HE0   | 115     | 6525            | MCS0      | 9.00                                         | 7.65                |
|             |                  | 147     | 6685            |           | 9.00                                         | 7.79                |
|             |                  | 179     | 6845            |           | 9.00                                         | 7.73                |
|             | 802.11ac80-VHT0  | 135     | 6625            | MCS0      | 12.00                                        | 10.66               |
|             |                  | 151     | 6705            |           | 12.00                                        | 11.98               |
|             |                  | 167     | 6785            |           | 12.00                                        | 10.79               |
|             | 802.11ax80-HE0   | 135     | 6625            | MCS0      | 12.00                                        | 11.00               |
|             |                  | 151     | 6705            |           | 12.00                                        | 11.73               |
|             |                  | 167     | 6785            |           | 12.00                                        | 11.03               |
|             | 802.11ac160-VHT0 | 143     | 6665            | MCS0      | 13.00                                        | 12.82               |
|             |                  | 175     | 6825            |           | 13.00                                        | 12.95               |
|             | 802.11ax160-HE0  | 143     | 6665            | MCS0      | 13.00                                        | 12.69               |
|             |                  | 175     | 6825            |           | 13.00                                        | 12.99               |

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| Aux Antenna |                  |         |                 |           |                                              |                     |
|-------------|------------------|---------|-----------------|-----------|----------------------------------------------|---------------------|
| Band        | Mode             | Channel | Frequency (MHz) | Data Rate | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| U-NII-8     | 802.11a          | 185     | 6875            | 6Mbps     | 6.00                                         | 4.49                |
|             |                  | 209     | 6995            |           | 6.00                                         | 4.57                |
|             | 802.11n20-HT0    | 185     | 6875            | MCS0      | 6.00                                         | 4.56                |
|             |                  | 209     | 6995            |           | 6.00                                         | 4.67                |
|             | 802.11ac20-VHT0  | 185     | 6875            | MCS0      | 6.00                                         | 4.52                |
|             |                  | 209     | 6995            |           | 6.00                                         | 4.66                |
|             | 802.11ax20-HE0   | 185     | 6875            | MCS0      | 6.00                                         | 4.90                |
|             |                  | 209     | 6995            |           | 6.00                                         | 4.76                |
|             | 802.11n40-HT0    | 187     | 6885            | MCS0      | 9.00                                         | 7.63                |
|             |                  | 227     | 7085            |           | 9.00                                         | 7.71                |
|             | 802.11ac40-VHT0  | 187     | 6885            | MCS0      | 9.00                                         | 7.61                |
|             |                  | 227     | 7085            |           | 9.00                                         | 7.63                |
|             | 802.11ax40-HE0   | 187     | 6885            | MCS0      | 9.00                                         | 7.71                |
|             |                  | 227     | 7085            |           | 9.00                                         | 7.98                |
|             | 802.11ac80-VHT0  | 183     | 6865            | MCS0      | 12.00                                        | 10.88               |
|             |                  | 199     | 6945            |           | 12.00                                        | 10.72               |
|             |                  | 215     | 7025            |           | 12.00                                        | 10.79               |
|             | 802.11ax80-HE0   | 183     | 6865            | MCS0      | 12.00                                        | 10.93               |
|             |                  | 199     | 6945            |           | 12.00                                        | 10.96               |
|             |                  | 215     | 7025            |           | 12.00                                        | 11.07               |
|             | 802.11ac160-VHT0 | 207     | 6985            | MCS0      | 13.00                                        | 12.70               |
|             | 802.11ax160-HE0  | 207     | 6985            | MCS0      | 13.00                                        | 12.91               |

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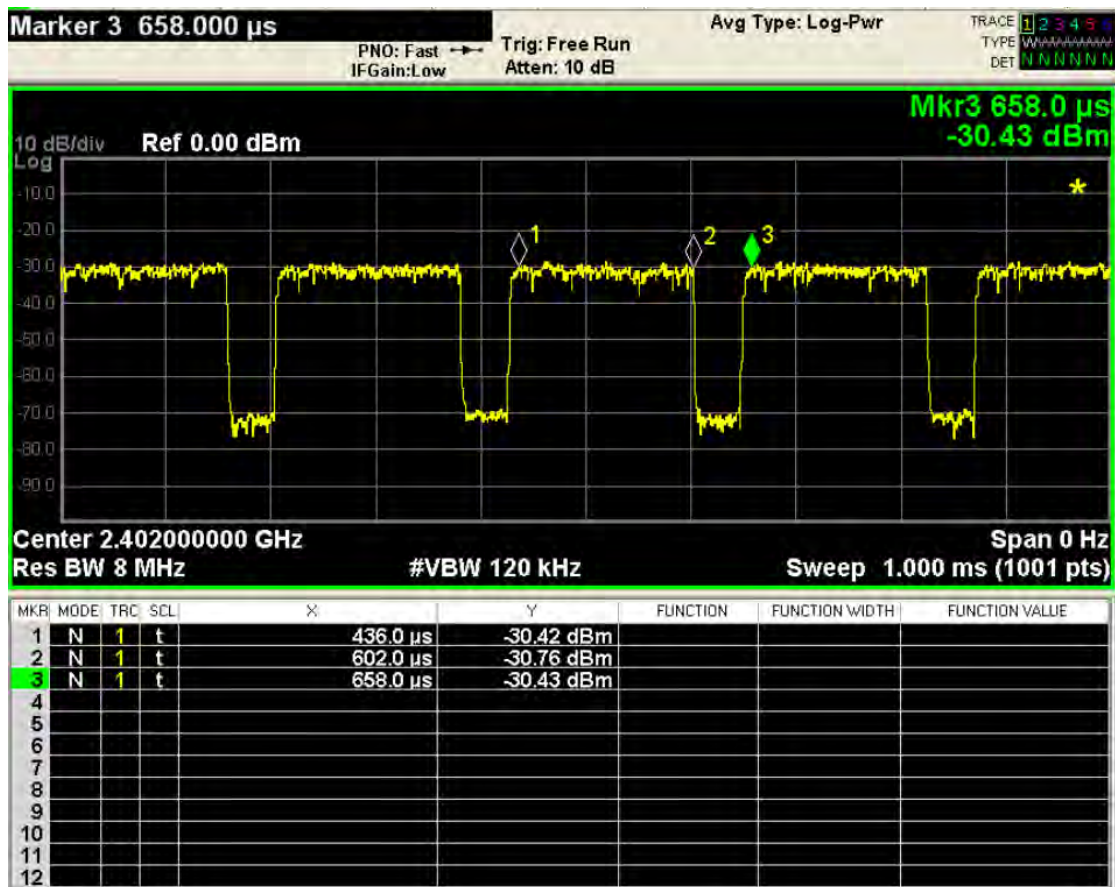
### Bluetooth conducted power table:

| Mode     | Channel | Frequency (MHz) | 1Mbps                                        |                     | 2Mbps                                        |                            | 3Mbps                                        |                     |
|----------|---------|-----------------|----------------------------------------------|---------------------|----------------------------------------------|----------------------------|----------------------------------------------|---------------------|
|          |         |                 | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm)        | Max. Rated Avg. Power + Max. Tolerance (dBm) | Average power (dBm) |
| BR/EDR   | CH 00   | 2402            | 11.50                                        | 10.18               | 11.00                                        | 10.11                      | 11.00                                        | 10.17               |
|          | CH 39   | 2441            |                                              | 10.98               |                                              | 10.29                      |                                              | 10.41               |
|          | CH 78   | 2480            |                                              | 11.32               |                                              | 10.18                      |                                              | 10.19               |
| Mode     | Channel | Frequency (MHz) | GFSK                                         |                     |                                              |                            |                                              |                     |
|          |         |                 | Max. Rated Avg. Power + Max. Tolerance (dBm) |                     |                                              | Average Output Power (dBm) |                                              |                     |
| LE_1Mbps | CH 00   | 2402            | 10                                           |                     |                                              | 9.74                       |                                              |                     |
|          | CH 19   | 2440            |                                              |                     |                                              | 9.70                       |                                              |                     |
|          | CH 39   | 2480            |                                              |                     |                                              | 9.97                       |                                              |                     |
| Mode     | Channel | Frequency (MHz) | GFSK                                         |                     |                                              |                            |                                              |                     |
|          |         |                 | Max. Rated Avg. Power + Max. Tolerance (dBm) |                     |                                              | Average Output Power (dBm) |                                              |                     |
| LE_2Mbps | CH 00   | 2402            | 10                                           |                     |                                              | 9.54                       |                                              |                     |
|          | CH 19   | 2440            |                                              |                     |                                              | 9.45                       |                                              |                     |
|          | CH 39   | 2480            |                                              |                     |                                              | 9.83                       |                                              |                     |

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## Bluetooth



Total time

166us

Operating time

222us

Duty cycle

$(166/222) = 0.747$

Duty factor

$1/0.747 = 1.339$

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## 2.4G b Main



Total time  
8.4ms  
Operating time  
8.1ms  
Duty cycle  
(8.1/8.4) = 0.964  
Duty factor  
1/0.964 = 1.037

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## 5G ac 80MHz Main



Total time

4.02ms

Operating time

3.74ms

Duty cycle

$(3.74/4.02) = 0.930$

Duty factor

$1/0.930 = 1.075$

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## 5G ax 80MHz Main



Total time

4.02ms

### Operating time

3.86ms

### Duty cycle

$$(3.86/4.02) = 0.960$$

Duty factor

$$1/0.960=1.042$$

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## 2.4G b Aux



Total time  
8.405ms  
Operating time  
8.125ms  
Duty cycle  
 $(8.125/8.405) = 0.966$   
Duty factor  
 $1/0.966 = 1.035$

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5G ac 80MHz Aux

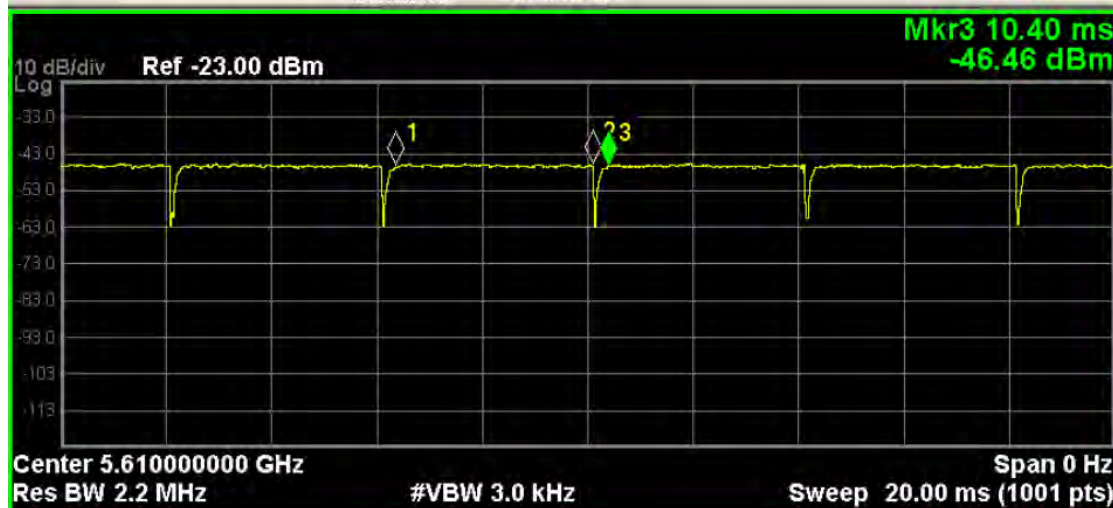
Marker 3 10.4000 ms

PN0: Fast  
IFGain: Low

Trig: Free Run  
Atten: 10 dB

Avg Type: Log-Pwr

TRACE 1 2 3 4 5  
TYPE W W W W W W W W W W  
DET N N N N N N N N N N



| MKR | MODE | TRC | SCL | X        | Y          | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|-----|------|-----|-----|----------|------------|----------|----------------|----------------|
| 1   | N    | 1   | t   | 6.360 ms | -46.67 dBm |          |                |                |
| 2   | N    | 1   | t   | 10.10 ms | -46.24 dBm |          |                |                |
| 3   | N    | 1   | t   | 10.40 ms | -46.46 dBm |          |                |                |
| 4   |      |     |     |          |            |          |                |                |
| 5   |      |     |     |          |            |          |                |                |
| 6   |      |     |     |          |            |          |                |                |
| 7   |      |     |     |          |            |          |                |                |
| 8   |      |     |     |          |            |          |                |                |
| 9   |      |     |     |          |            |          |                |                |
| 10  |      |     |     |          |            |          |                |                |
| 11  |      |     |     |          |            |          |                |                |
| 12  |      |     |     |          |            |          |                |                |

Total time

4.04ms

Operating time

3.74ms

Duty cycle

$(3.74/4.04) = 0.925$

Duty factor

$1/0.925 = 1.081$

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## WiFi 6E ac(160M)\_duty (3.96/4.008=0.988)



Duty cycle

(3.96/4.008) = 0.988

Duty factor

1/0.988=1.012

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## 1.4 Test Environment

Ambient Temperature:  $22\pm 2^{\circ}\text{C}$

Tissue Simulating Liquid:  $22\pm 2^{\circ}\text{C}$

## 1.5 Operation Description

1. An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band.
2. SAR is measured using the highest measured maximum output power channel. When the reported SAR of the initial test configuration is  $> 0.8\text{ W/kg}$ , SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the reported SAR is  $\leq 1.2\text{ W/kg}$  or all required channels are tested.
3. Since the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is  $\leq 1.2\text{ W/kg}$ , SAR is not required for subsequent test configuration.
4. Per 201904 TCBC workshops, general principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing.
5. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
6. According to KDB865664 D01, SAR measurement variability must be assessed for each frequency band. When the original highest measured SAR is  $\geq 0.8\text{ W/kg}$ , repeated that measurement once. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is  $> 1.20$  or when the original or repeated measurement is  $\geq 1.45\text{ W/kg}$  ( $\sim 10\%$  from the 1-g SAR limit)
7. WIFI 6E of the device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools.
8. Per October 2020 & April 2021 TCB Workshop Interim procedures and FCC guidance, start instead with a minimum of 5 test channels across the full band, then adapt and apply conducted power and SAR test reduction procedures of KDB Pub. 248227 v02r02.

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9. WIFI 6E SAR is measured by using 6-7GHz parameters per IEC/IEEE62209-1528:2020 and report also estimated absorbed PD (for reference purposes only, not specifically for compliance).
10. For the highest SAR test configurations also measure incident PD (total) using mmW near-field probe and total-field/power-density reconstruction method.
11. The PD test was performed with a 2 mm separation between probe sensor and EUT bottom surface, and totally five PD test is selected per each antenna. (Select highest SAR configurations to evaluate power density.)
12. Per equipment manufacturer guidance, power density was measured at d=2mm with the grid step ( $0.0625 \lambda$ ) for determining compliance at d=2mm.
13. According to October 2020 TCB Workshop Interim procedures, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.67 dB (85%) was used to determine the psPD measurement scaling factor.
14. Per FCC guidance, for simultaneous transmission evaluation, using SAR sum and SPLSR for simultaneous transmit exclusion analyses and evaluations.

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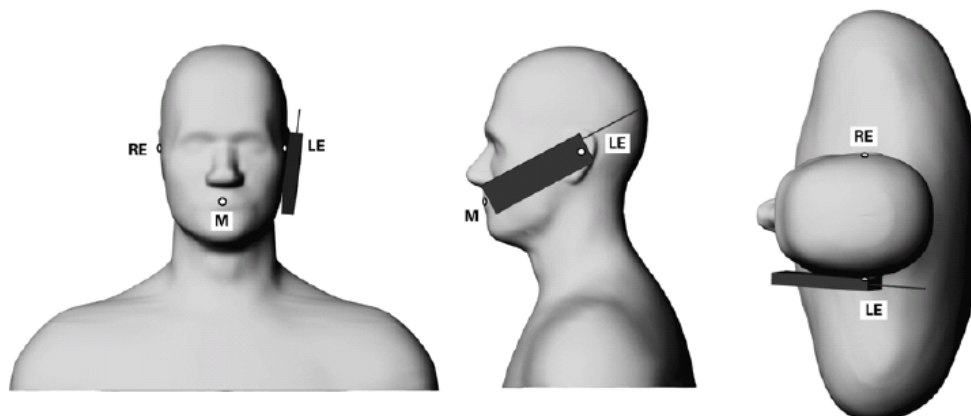
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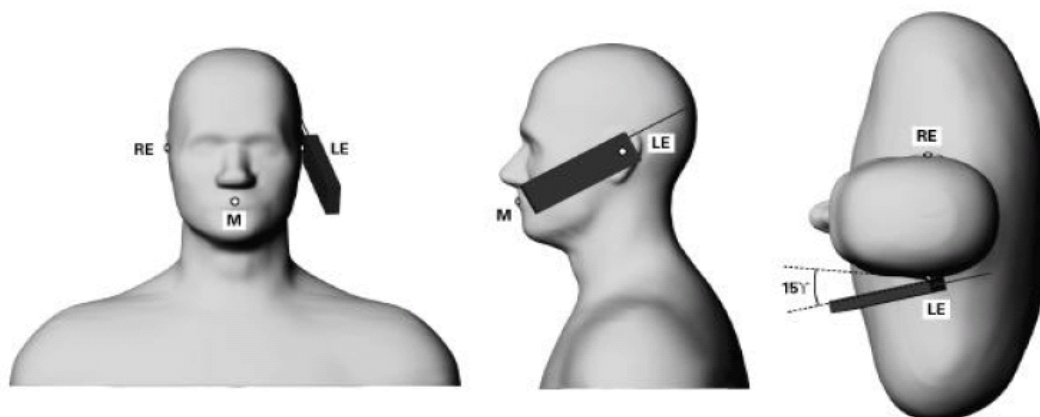
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## 1.6 Positioning Procedure Head SAR measurement statement



Phone position 1, “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.



Phone position 2, “tilted position.” The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.

### Cheek/Touch Position:

The handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.

### Ear/Tilt Position:

With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

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## 1.7 Evaluation Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
3. The generation of a high-resolution mesh within the measured volume.
4. The interpolation of all measured values from the measurement grid to the high-resolution grid.
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface.
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans.

The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is

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the moved around until the highest averaged SAR is found.

If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

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## 1.8 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

### 1.8.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field ( $E$ ) and the temperature gradient ( $\delta T / \delta t$ ) in the liquid.

$$SAR = C \frac{\delta T}{\delta t},$$

Whereby  $\sigma$  is the conductivity,  $\rho$  the density and  $c$  the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

1. The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the thermal equilibrium in the liquid. With a careful setup these errors can be kept

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small.

2. The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.
3. The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures ( $\sim 2\%$  for  $c$ ; much better for  $\rho$ ), there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed  $\pm 5\%$ .
4. Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about  $\pm 10\%$  (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is  $\pm 5\%$  (RSS) when the same liquid is used for the calibration and for actual measurements and  $\pm 7-9\%$  (RSS) when not, which is in good agreement with the estimates given in [2].

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### 1.8.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.

When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:

1. The setup must enable accurate determination of the incident power.
2. The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.
3. Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

### References

- (1) N. Kuster, Q. Balzano, and J.C. Lin, Eds., *Mobile Communications Safety*, Chapman & Hall, London, 1997.
- (2) K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, "Broadband calibration of E-field probes in lossy media", *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 10, pp. 1954-1962, Oct. 1996.
- (3) K. Jokela, P. Hyysalo, and L. Puranen, "Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", *IEEE Transactions on Instrumentation and Measurements*, vol. 47, no. 2, pp. 432-438, Apr. 1998.

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## 1.9 SAR System Description and Setup

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

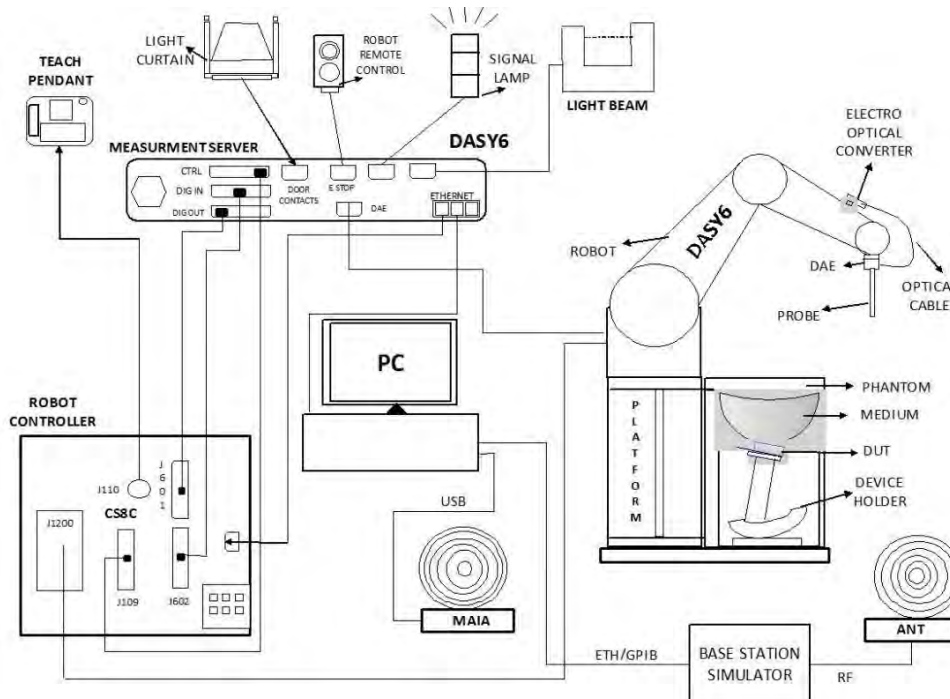


Fig. a A block diagram of the SAR measurement system

- A standard high precision 6-axis robot 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

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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 Windows 10 and the DASY6 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

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### 1.9.1 Power density measurement system

#### DASY6 system

Power density measurements for mmWave frequencies were performed using SPEAG DASY6 with cDASY6 5G module. The DASY6 included a high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the 5G phantom cover.

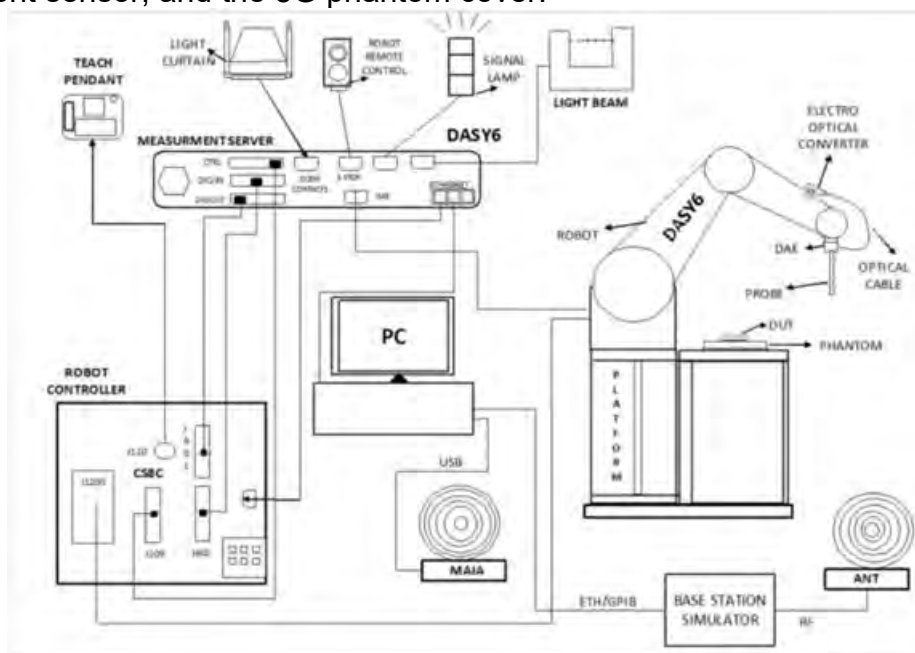


Fig-2.1 SPEAG DASY6 system

#### EUmmWVx probe

The EUmmWVx probe is based on the pseudo-vector probe design, which not only measures the field magnitude but also derives its polarization ellipse. The design entails two small 0.8mm dipole sensors mechanically protected by high-density foam, printed on both sides of a 0.9mm wide and 0.12mm thick glass substrate. The body of the probe is specifically constructed to minimize distortion by the scattered fields. The probe consist of two sensors with different angles (1 and 2) arranged in the same plane in the probe axis. Three or more measurements of the two sensors are taken for different probe rotational angles to derive the amplitude and polarization information. The probe design allows measurements at distances as small as 2mm from the sensors to the surface of the device under test (DUT). The typical sensor to probe tip distance is 1.5 mm. The exact distance is calibrated.

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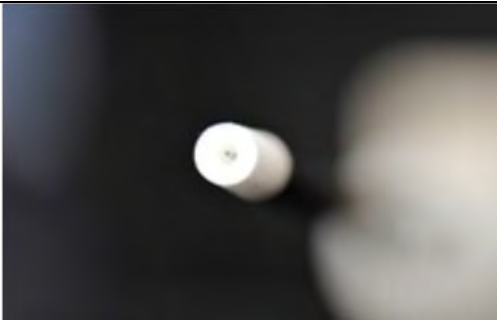
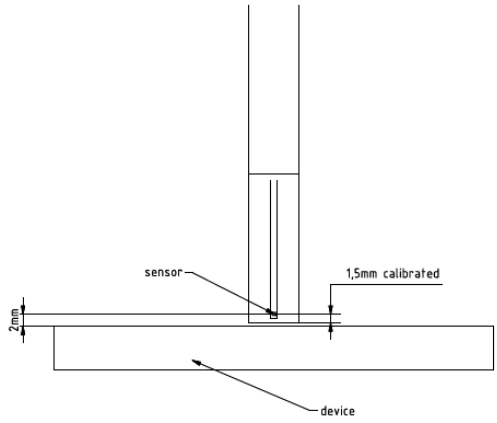
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|                                                                                                         |                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <p>Two dipoles optimally arranged to obtain pseudo-vector information. Minimum 3 measurements/ point, 120° rotated around probe axis.</p> <p>Sensors (0.8mm length) printed on glass substrate protected by high density foam. Low perturbation of the measured field. Requires positioner which can do accurate probe rotation.</p> |
| Frequency Range                                                                                         | 750 MHz – 110 GHz                                                                                                                                                                                                                                                                                                                    |
| Dynamic Range                                                                                           | < 20 V/m – 10,000 V/m with PRE-10 (min < 50 V/m - 3000 V/m)                                                                                                                                                                                                                                                                          |
| Position Precision                                                                                      | < 0.2 mm (DASY6)                                                                                                                                                                                                                                                                                                                     |
| Dimensions                                                                                              | <p>Overall length: 337 mm (tip: 20 mm)</p> <p>Tip diameter: encapsulation 8 mm (internal sensor &lt; 1mm)</p> <p>Distance from probe tip to dipole centers: &lt; 2 mm. Sensor displacement to probe's calibration point: &lt; 0.3 mm</p>                                                                                             |
| <p>Applications</p>  | <p>E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in &lt; 2 mm distance from device (free-space). Power density, H-field and far-field analysis using total field reconstruction (cDASY6 5G module required)</p>                                                                            |
| Compatibility                                                                                           | cDASY6 + 5G-Module SW1.0 and higher                                                                                                                                                                                                                                                                                                  |

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## 1.9.2 SAR System Performance Check Results

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within  $\pm 10\%$  (according to KDB865664D01) from the target SAR values.

These tests were done at 2450/5200/5300/5600/5800/6500/7000 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the liquid depth above the ear reference points was above 15 cm ( $\leq 3G$ ) or 10 cm ( $> 3G$ ) in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

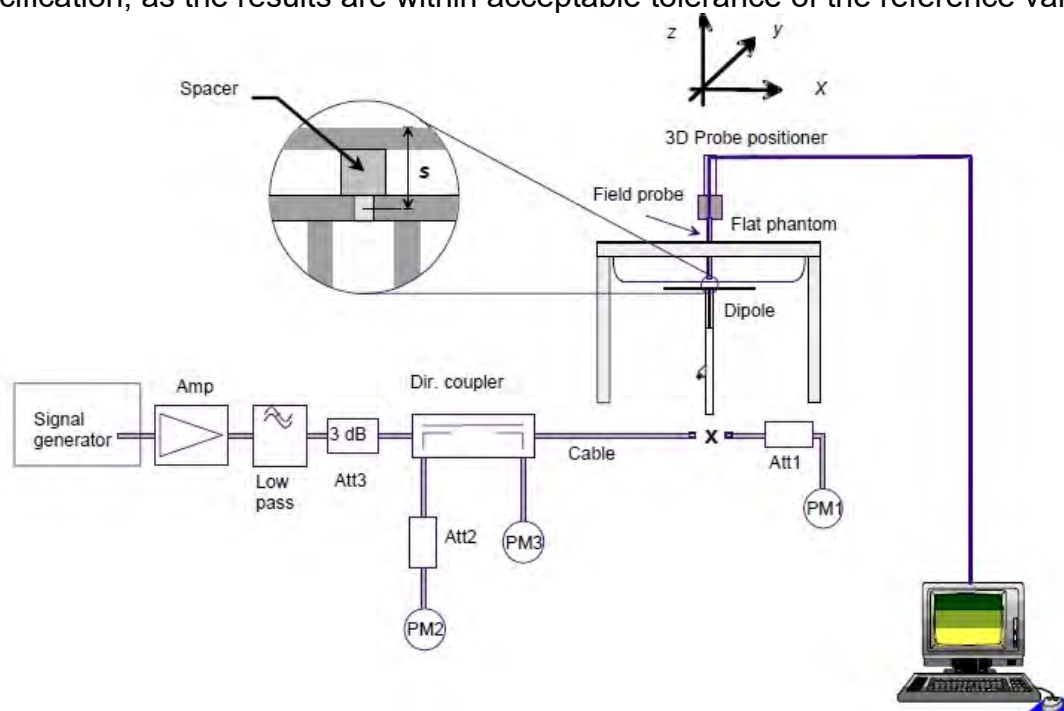


Fig. b The block diagram of system verification

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| Validation Kit | S/N  | Frequency (MHz) |      | 1W Target SAR-1g (mW/g) | pin=250mW Measured SAR-1g (mW/g) | Measured SAR-1g normalized to 1W (mW/g) | Deviation (%) | Measured Date |
|----------------|------|-----------------|------|-------------------------|----------------------------------|-----------------------------------------|---------------|---------------|
| D2450V2        | 727  | 2450            | Head | 53.9                    | 13.00                            | 52                                      | -3.53%        | Jun. 28, 2021 |
| Validation Kit | S/N  | Frequency (MHz) |      | 1W Target SAR-1g (mW/g) | Pin=100mW Measured SAR-1g (mW/g) | Measured SAR-1g normalized to 1W (mW/g) | Deviation (%) | Measured Date |
| D5GHzV2        | 1023 | 5200            | Head | 77.9                    | 7.87                             | 78.7                                    | 1.03%         | Jun. 28, 2021 |
|                |      | 5300            | Head | 80.4                    | 8.10                             | 81                                      | 0.75%         | Jun. 29, 2021 |
|                |      | 5600            | Head | 83.9                    | 8.55                             | 85.5                                    | 1.91%         | Jun. 29, 2021 |
|                |      | 5800            | Head | 80.9                    | 8.04                             | 80.4                                    | -0.62%        | Jun. 29, 2021 |
| D6.5GHzV2      | 1006 | 6500            | Head | 291                     | 29.90                            | 299                                     | 2.75%         | Jun. 27, 2021 |
| D7GHzV2        | 1007 | 7000            | Head | 273                     | 28.20                            | 282                                     | 3.30%         | Jun. 27, 2021 |

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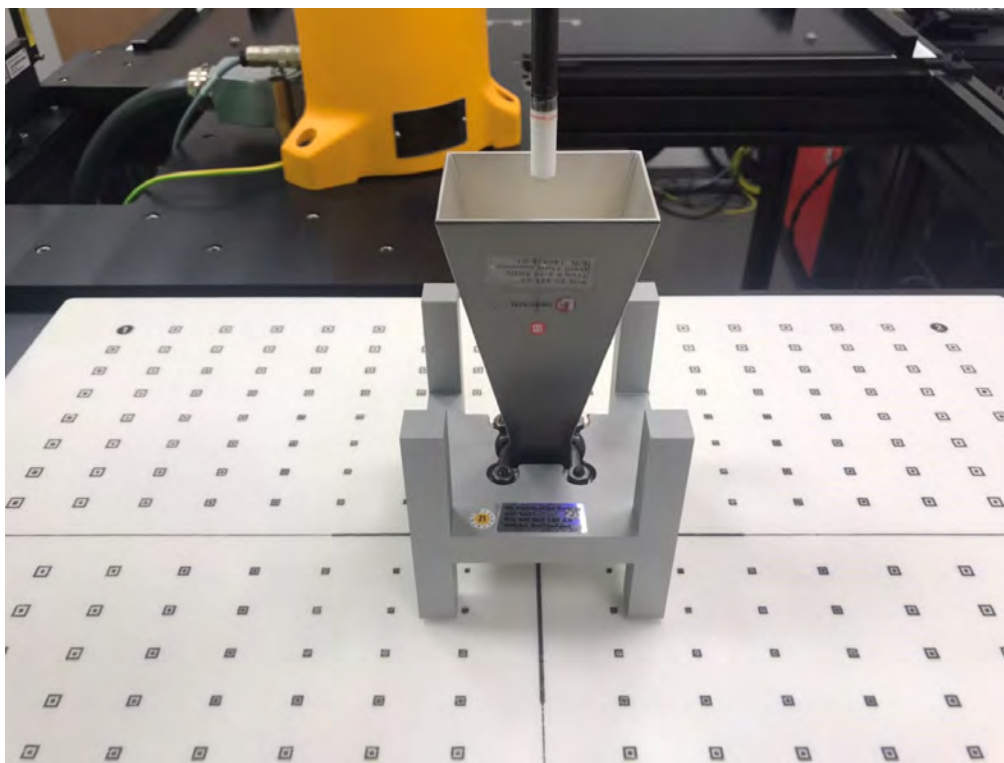
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## Power Density Test System Verification

The system was verified to be within  $\pm 0.66$  dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.



System Verification Setup Photo

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## PD System Verification Results

The system was verified to be within  $\pm 0.66$  dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check. The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

| Frequency (GHz) | PD Verification Source | Probe S/N | DAE S/N | Distance (mm) | Prad (mW) | Measured $4\text{cm}^2$ ( $\text{W/m}^2$ ) | Target $4\text{cm}^2$ ( $\text{W/m}^2$ ) | Deviation (dB) | Date          |
|-----------------|------------------------|-----------|---------|---------------|-----------|--------------------------------------------|------------------------------------------|----------------|---------------|
| 10G             | 10G                    | 9548      | 877     | 10            | 74        | 41.5                                       | 42.3                                     | -0.08          | Jun. 28, 2021 |

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### 1.9.3 SAR Tissue Verification

The dielectric properties for this Head-simulant fluid were measured by using the SPEAG Dielectric Assessment Kit (DAKS-3.5)

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The measured conductivity and permittivity are all within  $\pm 5\%$  of the target values.

The depth of the tissue simulant in the flat section of the phantom was  $\geq 15 \text{ cm} \pm 5 \text{ mm}$  (Frequency  $\leq 3\text{G}$ ) or  $\geq 10 \text{ cm} \pm 5 \text{ mm}$  (Frequency  $> 3\text{G}$ ) during all tests. (Fig. 2)

| Tissue Type | Measurement Date | Measured Frequency (MHz) | Target Dielectric Constant, $\epsilon_r$ | Target Conductivity, $\sigma$ (S/m) | Measured Dielectric Constant, $\epsilon_r$ | Measured Conductivity, $\sigma$ (S/m) | % dev $\epsilon_r$ | % dev $\sigma$ |
|-------------|------------------|--------------------------|------------------------------------------|-------------------------------------|--------------------------------------------|---------------------------------------|--------------------|----------------|
| Head        | Jun, 28. 2021    | 2402                     | 39.285                                   | 1.757                               | 39.221                                     | 1.763                                 | -0.16%             | 0.32%          |
|             |                  | 2412                     | 39.268                                   | 1.766                               | 39.191                                     | 1.774                                 | -0.19%             | 0.44%          |
|             |                  | 2437                     | 39.223                                   | 1.788                               | 39.135                                     | 1.795                                 | -0.22%             | 0.37%          |
|             |                  | 2441                     | 39.216                                   | 1.792                               | 39.127                                     | 1.798                                 | -0.23%             | 0.33%          |
|             |                  | 2450                     | 39.200                                   | 1.800                               | 39.106                                     | 1.806                                 | -0.24%             | 0.33%          |
|             |                  | 2462                     | 39.185                                   | 1.813                               | 39.082                                     | 1.816                                 | -0.26%             | 0.16%          |
|             |                  | 2480                     | 39.162                                   | 1.833                               | 39.036                                     | 1.831                                 | -0.32%             | -0.09%         |
|             |                  | 5200                     | 35.986                                   | 4.655                               | 35.837                                     | 4.591                                 | -0.41%             | -1.37%         |
|             |                  | 5210                     | 35.974                                   | 4.665                               | 35.774                                     | 4.603                                 | -0.56%             | -1.33%         |
|             | Jun, 29. 2021    | 5290                     | 35.883                                   | 4.747                               | 35.566                                     | 4.717                                 | -0.88%             | -0.64%         |
|             |                  | 5300                     | 35.871                                   | 4.758                               | 35.549                                     | 4.727                                 | -0.90%             | -0.64%         |
|             |                  | 5530                     | 35.609                                   | 4.993                               | 35.036                                     | 4.991                                 | -1.61%             | -0.05%         |
|             |                  | 5600                     | 35.529                                   | 5.065                               | 34.872                                     | 5.077                                 | -1.85%             | 0.24%          |
|             |                  | 5610                     | 35.517                                   | 5.075                               | 34.844                                     | 5.091                                 | -1.90%             | 0.31%          |
|             |                  | 5690                     | 35.426                                   | 5.157                               | 34.691                                     | 5.183                                 | -2.07%             | 0.50%          |
|             |                  | 5775                     | 35.329                                   | 5.244                               | 34.544                                     | 5.285                                 | -2.22%             | 0.77%          |
|             |                  | 5800                     | 35.300                                   | 5.270                               | 34.513                                     | 5.316                                 | -2.23%             | 0.87%          |
|             | Jun, 27. 2021    | 6025                     | 35.043                                   | 5.501                               | 34.474                                     | 5.589                                 | -1.62%             | 1.60%          |
|             |                  | 6185                     | 34.860                                   | 5.665                               | 34.360                                     | 5.753                                 | -1.43%             | 1.55%          |
|             |                  | 6345                     | 34.677                                   | 5.829                               | 34.122                                     | 5.909                                 | -1.60%             | 1.37%          |
|             |                  | 6500                     | 34.500                                   | 5.988                               | 33.897                                     | 6.066                                 | -1.75%             | 1.30%          |
|             |                  | 6505                     | 34.494                                   | 5.993                               | 33.968                                     | 6.107                                 | -1.52%             | 1.90%          |
|             |                  | 6825                     | 34.129                                   | 6.321                               | 33.573                                     | 6.419                                 | -1.63%             | 1.55%          |
|             |                  | 6985                     | 33.946                                   | 6.485                               | 33.290                                     | 6.600                                 | -1.93%             | 1.77%          |
|             |                  | 7000                     | 33.900                                   | 6.650                               | 33.240                                     | 6.743                                 | -1.95%             | 1.40%          |

Table 2. Dielectric Parameters of Tissue Simulant Fluid

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## 1.10 System Components

### EX3DV4 E-Field Probe

|               |                                                                                                                                                                                                            |                                                                                     |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Construction  | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE)                                                |  |
| Calibration   | Basic Broad Band Calibration in air<br>Conversion Factors (CF) for<br>HSL2450/5200/5300/5600/5800/6500/7000<br>MHz Additional CF for other liquids and frequencies upon request                            |                                                                                     |
| Frequency     | 10 MHz to > 6 GHz, Linearity: $\pm 0.6$ dB                                                                                                                                                                 |                                                                                     |
| Directivity   | $\pm 0.3$ dB in HSL (rotation around probe axis)<br>$\pm 0.5$ dB in tissue material (rotation normal to probe axis)                                                                                        |                                                                                     |
| Dynamic Range | 10 $\mu$ W/g to > 100 mW/g<br>Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)                                                                                                                     |                                                                                     |
| Dimensions    | Tip diameter: 2.5 mm                                                                                                                                                                                       |                                                                                     |
| Application   | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |                                                                                     |

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## PHANTOM

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model           | ELI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                     |
| Construction    | The ELI phantom is used 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      | Major axis: 600 mm<br>Minor axis: 400 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |

## DEVICE HOLDER

|              |                                                                                                                                                                                         |                                                                                      |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Construction | The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin) , which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks. |  |
|              |                                                                                                                                                                                         | Device Holder                                                                        |

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### 1.11 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1, By the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter.

Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1. Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over a 10 grams of tissue (defined as a tissue volume in the shape of a cube).

Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

2. Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube).

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Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube).

General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.

Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .6)

| Human Exposure                               | Uncontrolled Environment<br>General Population | Controlled Environment<br>Occupational |
|----------------------------------------------|------------------------------------------------|----------------------------------------|
| Spatial Peak SAR<br>(Brain)                  | 1.60 W/kg                                      | 8.00 W/kg                              |
| Spatial Average SAR<br>(Whole Body)          | 0.08 W/kg                                      | 0.40 W/kg                              |
| Spatial Peak SAR<br>(Hands/Feet/Ankle/Wrist) | 4.00 W/kg                                      | 20.00 W/kg                             |

## RF Exposure limit for above 6GHz

According to ANSI/IEEE C95.1-1992, the criteria listed in the following Table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm<sup>2</sup> per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

| Frequency range<br>(MHz)                                       | Electric field strength<br>(V/m) | Magnetic field strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|----------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------------|-----------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                                  |                                  |                                        |                             |
| 0.3-3.0                                                        | 614                              | 1.63                             | *(100)                                 | 6                           |
| 3.0-30                                                         | 1842/f                           | 4.89/f                           | *(900/f <sup>2</sup> )                 | 6                           |
| 30-300                                                         | 61.4                             | 0.163                            | 1.0                                    | 6                           |
| 300-1500                                                       |                                  |                                  | f/300                                  | 6                           |
| 1500-100,000                                                   |                                  |                                  | 5                                      | 6                           |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                  |                                  |                                        |                             |
| 0.3-1.34                                                       | 614                              | 1.63                             | *(100)                                 | 30                          |
| 1.34-30                                                        | 824/f                            | 2.19/f                           | *(180/f <sup>2</sup> )                 | 30                          |
| 30-300                                                         | 27.5                             | 0.073                            | 0.2                                    | 30                          |
| 300-1500                                                       |                                  |                                  | f/1500                                 | 30                          |
| 1500-100,000                                                   |                                  |                                  | 1.0                                    | 30                          |

Table. RF exposure limits

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## Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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## 2. Summary of Results

### 2.1 Decision rules

Reported measurement data comply with IEEE 1528-2013 and IEC/IEEE 62209-1528:2020:

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.2 Summary of SAR Results

#### Notebook mode

| Antenna | Mode                    | Position        | Distance (mm) | CH  | Freq. (MHz) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Measured Avg. Power (dBm) | Duty cycle scaling | Power scaling | Averaged SAR over 1g (W/kg) |          | Plot page |
|---------|-------------------------|-----------------|---------------|-----|-------------|----------------------------------------------|---------------------------|--------------------|---------------|-----------------------------|----------|-----------|
|         |                         |                 |               |     |             |                                              |                           |                    |               | Measured                    | Reported |           |
| Main    | WLAN 802.11b            | Bottom surface  | 0             | 1   | 2412        | 20.00                                        | 19.83                     | 1.037              | 103.99%       | 0.087                       | 0.094    | -         |
|         |                         | Bottom surface  | 0             | 6   | 2437        | 20.00                                        | 19.94                     | 1.037              | 101.39%       | 0.152                       | 0.160    | -         |
|         |                         | Bottom surface  | 0             | 11  | 2462        | 20.00                                        | 19.86                     | 1.037              | 103.28%       | 0.240                       | 0.257    | 68        |
|         | WLAN 802.11ac(80M) 5.2G | Bottom surface  | 0             | 42  | 5210        | 18.00                                        | 17.98                     | 1.075              | 100.46%       | 0.828                       | 0.894    | 69        |
|         |                         | Bottom surface* | 0             | 42  | 5210        | 18.00                                        | 17.98                     | 1.075              | 100.46%       | 0.819                       | 0.885    | -         |
|         | WLAN 802.11ax(80M) 5.3G | Bottom surface  | 0             | 58  | 5290        | 18.00                                        | 17.91                     | 1.042              | 102.09%       | 0.656                       | 0.698    | 70        |
|         | WLAN 802.11ac(80M) 5.6G | Bottom surface  | 0             | 106 | 5530        | 18.00                                        | 17.99                     | 1.075              | 100.23%       | 0.739                       | 0.796    | -         |
|         |                         | Bottom surface  | 0             | 122 | 5610        | 18.00                                        | 18.00                     | 1.075              | 100.00%       | 0.852                       | 0.916    | -         |
|         |                         | Bottom surface  | 0             | 138 | 5690        | 18.00                                        | 17.97                     | 1.075              | 100.69%       | 0.979                       | 1.060    | 71        |
|         |                         | Bottom surface* | 0             | 138 | 5690        | 18.00                                        | 17.97                     | 1.075              | 100.69%       | 0.965                       | 1.045    | -         |
|         | WLAN 802.11ac(80M) 5.8G | Bottom surface  | 0             | 155 | 5775        | 18.00                                        | 17.97                     | 1.075              | 100.69%       | 0.910                       | 0.985    | 72        |
|         |                         | Bottom surface* | 0             | 155 | 5775        | 18.00                                        | 17.97                     | 1.075              | 100.69%       | 0.904                       | 0.979    | -         |
| Aux     | WLAN 802.11b            | Bottom surface  | 0             | 1   | 2412        | 20.00                                        | 19.92                     | 1.035              | 101.86%       | 0.261                       | 0.275    | -         |
|         |                         | Bottom surface  | 0             | 6   | 2437        | 20.00                                        | 19.96                     | 1.035              | 100.93%       | 0.285                       | 0.298    | -         |
|         |                         | Bottom surface  | 0             | 11  | 2462        | 20.00                                        | 19.87                     | 1.035              | 103.04%       | 0.315                       | 0.336    | 73        |
|         | Bluetooth(GFSK)         | Bottom surface  | 0             | 78  | 2480        | 11.50                                        | 11.32                     | 1.339              | 104.35%       | 0.015                       | 0.021    | 74        |
|         | WLAN 802.11ac(80M) 5.2G | Bottom surface  | 0             | 42  | 5210        | 18.00                                        | 17.98                     | 1.081              | 100.46%       | 0.649                       | 0.705    | 75        |
|         | WLAN 802.11ac(80M) 5.3G | Bottom surface  | 0             | 58  | 5290        | 18.00                                        | 17.96                     | 1.081              | 100.93%       | 0.705                       | 0.769    | 76        |
|         | WLAN 802.11ac(80M) 5.6G | Bottom surface  | 0             | 106 | 5530        | 18.00                                        | 17.97                     | 1.081              | 100.69%       | 0.734                       | 0.799    | -         |
|         |                         | Bottom surface  | 0             | 138 | 5690        | 18.00                                        | 17.99                     | 1.081              | 100.23%       | 0.983                       | 1.065    | 77        |
|         |                         | Bottom surface* | 0             | 138 | 5690        | 18.00                                        | 17.99                     | 1.081              | 100.23%       | 0.977                       | 1.059    | -         |
|         | WLAN 802.11ac(80M) 5.8G | Bottom surface  | 0             | 155 | 5775        | 18.00                                        | 17.99                     | 1.081              | 100.23%       | 1.000                       | 1.084    | 78        |
|         |                         | Bottom surface* | 0             | 155 | 5775        | 18.00                                        | 17.99                     | 1.081              | 100.23%       | 0.992                       | 1.075    | -         |

\* - repeated at the highest SAR measurement according to the KDB 865664 D01

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## WIFI 6E Main

| Mode                           | Position       | Distance (mm) | CH  | Freq. (MHz) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Measured Avg. Power (dBm) | Duty cycle scaling | Power scaling | Averaged SAR over 1g (W/kg) |          | Estimated APD mW/cm <sup>2</sup> (4cm <sup>2</sup> ) | Plot page |
|--------------------------------|----------------|---------------|-----|-------------|----------------------------------------------|---------------------------|--------------------|---------------|-----------------------------|----------|------------------------------------------------------|-----------|
|                                |                |               |     |             |                                              |                           |                    |               | Measured                    | Reported |                                                      |           |
| WLAN 6E 802.11ac(160M) U-NII-5 | Bottom Surface | 0             | 15  | 6025        | 13.00                                        | 12.80                     | 1.01               | 104.71%       | 0.326                       | 0.346    | 0.284                                                | 79        |
|                                | Bottom Surface | 0             | 47  | 6185        | 13.00                                        | 12.88                     | 1.01               | 102.80%       | 0.317                       | 0.330    | 0.264                                                | 80        |
| WLAN 6E 802.11ac(160M) U-NII-6 | Bottom Surface | 0             | 111 | 6505        | 13.00                                        | 12.73                     | 1.01               | 106.41%       | 0.241                       | 0.260    | 0.216                                                | 81        |
| WLAN 6E 802.11ac(160M) U-NII-7 | Bottom Surface | 0             | 175 | 6825        | 13.00                                        | 12.98                     | 1.01               | 100.46%       | 0.402                       | 0.409    | 0.340                                                | 82        |
| WLAN 6E 802.11ac(160M) U-NII-8 | Bottom Surface | 0             | 207 | 6985        | 13.00                                        | 12.63                     | 1.01               | 108.89%       | 0.238                       | 0.262    | 0.218                                                | 83        |

## WIFI 6E Aux

| Mode                           | Position       | Distance (mm) | CH  | Freq. (MHz) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Measured Avg. Power (dBm) | Duty cycle scaling | Power scaling | Averaged SAR over 1g (W/kg) |          | Estimated APD mW/cm <sup>2</sup> (4cm <sup>2</sup> ) | Plot page |
|--------------------------------|----------------|---------------|-----|-------------|----------------------------------------------|---------------------------|--------------------|---------------|-----------------------------|----------|------------------------------------------------------|-----------|
|                                |                |               |     |             |                                              |                           |                    |               | Measured                    | Reported |                                                      |           |
| WLAN 6E 802.11ac(160M) U-NII-5 | Bottom Surface | 0             | 15  | 6025        | 13.00                                        | 12.86                     | 1.01               | 103.28%       | 0.297                       | 0.310    | 0.248                                                | 84        |
|                                | Bottom Surface | 0             | 47  | 6185        | 13.00                                        | 12.98                     | 1.01               | 100.46%       | 0.274                       | 0.279    | 0.204                                                | 85        |
| WLAN 6E 802.11ac(160M) U-NII-6 | Bottom Surface | 0             | 111 | 6505        | 13.00                                        | 12.76                     | 1.01               | 105.68%       | 0.134                       | 0.143    | 0.114                                                | 86        |
| WLAN 6E 802.11ac(160M) U-NII-7 | Bottom Surface | 0             | 175 | 6825        | 13.00                                        | 12.95                     | 1.01               | 101.16%       | 0.289                       | 0.296    | 0.212                                                | 87        |
| WLAN 6E 802.11ac(160M) U-NII-8 | Bottom Surface | 0             | 207 | 6985        | 13.00                                        | 12.70                     | 1.01               | 107.15%       | 0.163                       | 0.177    | 0.125                                                | 88        |

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## 2.3 Summary of PD Results

### Main

| Mode                           | Position       | Distance (mm) | CH  | Freq. (MHz) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Measured Avg. Power (dBm) | Tune-up Scaling | Duty Cycle | Duty Factor | Measurement uncertainty | PD result(4cm)                            |                                           |                                            |                                            | Plot page |
|--------------------------------|----------------|---------------|-----|-------------|----------------------------------------------|---------------------------|-----------------|------------|-------------|-------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------------------------|-----------|
|                                |                |               |     |             |                                              |                           |                 |            |             |                         | Measured Total psPD (mW/cm <sup>2</sup> ) | Reported Total psPD (mW/cm <sup>2</sup> ) | Measured Normal psPD (mW/cm <sup>2</sup> ) | Reported Normal psPD (mW/cm <sup>2</sup> ) |           |
| WLAN 6E 802.11ac(160M) U-NII-5 | Bottom Surface | 2             | 15  | 6025        | 13                                           | 12.80                     | 104.71%         | 0.988      | 1.012       | 1.55                    | 0.129                                     | 0.212                                     | 0.124                                      | 0.204                                      | 89        |
|                                | Bottom Surface | 2             | 47  | 6185        | 13                                           | 12.88                     | 102.80%         | 0.988      | 1.012       | 1.55                    | 0.202                                     | 0.326                                     | 0.185                                      | 0.298                                      | 90        |
| WLAN 6E 802.11ac(160M) U-NII-6 | Bottom Surface | 2             | 111 | 6505        | 13                                           | 12.73                     | 106.41%         | 0.988      | 1.012       | 1.55                    | 0.165                                     | 0.275                                     | 0.154                                      | 0.257                                      | 91        |
| WLAN 6E 802.11ac(160M) U-NII-7 | Bottom Surface | 2             | 175 | 6825        | 13                                           | 12.98                     | 100.46%         | 0.988      | 1.012       | 1.55                    | 0.219                                     | 0.345                                     | 0.208                                      | 0.328                                      | 92        |
| WLAN 6E 802.11ac(160M) U-NII-8 | Bottom Surface | 2             | 207 | 6985        | 13                                           | 12.63                     | 108.89%         | 0.988      | 1.012       | 1.55                    | 0.072                                     | 0.123                                     | 0.050                                      | 0.085                                      | 93        |

### Aux

| Mode                           | Position       | Distance (mm) | CH  | Freq. (MHz) | Max. Rated Avg. Power + Max. Tolerance (dBm) | Measured Avg. Power (dBm) | Tune-up Scaling | Duty Cycle | Duty Factor | Measurement uncertainty | PD result(4cm)                            |                                           |                                            |                                            | Plot page |
|--------------------------------|----------------|---------------|-----|-------------|----------------------------------------------|---------------------------|-----------------|------------|-------------|-------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------------------------|-----------|
|                                |                |               |     |             |                                              |                           |                 |            |             |                         | Measured Total psPD (mW/cm <sup>2</sup> ) | Reported Total psPD (mW/cm <sup>2</sup> ) | Measured Normal psPD (mW/cm <sup>2</sup> ) | Reported Normal psPD (mW/cm <sup>2</sup> ) |           |
| WLAN 6E 802.11ac(160M) U-NII-5 | Bottom Surface | 2             | 15  | 6025        | 13                                           | 12.86                     | 103.28%         | 0.988      | 1.012       | 1.55                    | 0.173                                     | 0.280                                     | 0.164                                      | 0.266                                      | 94        |
|                                | Bottom Surface | 2             | 47  | 6185        | 13                                           | 12.98                     | 100.46%         | 0.988      | 1.012       | 1.55                    | 0.209                                     | 0.329                                     | 0.177                                      | 0.279                                      | 95        |
| WLAN 6E 802.11ac(160M) U-NII-6 | Bottom Surface | 2             | 111 | 6505        | 13                                           | 12.76                     | 105.68%         | 0.988      | 1.012       | 1.55                    | 0.117                                     | 0.194                                     | 0.110                                      | 0.182                                      | 96        |
| WLAN 6E 802.11ac(160M) U-NII-7 | Bottom Surface | 2             | 175 | 6825        | 13                                           | 12.95                     | 101.16%         | 0.988      | 1.012       | 1.55                    | 0.165                                     | 0.262                                     | 0.156                                      | 0.248                                      | 97        |
| WLAN 6E 802.11ac(160M) U-NII-8 | Bottom Surface | 2             | 207 | 6985        | 13                                           | 12.70                     | 107.15%         | 0.988      | 1.012       | 1.55                    | 0.136                                     | 0.229                                     | 0.124                                      | 0.208                                      | 98        |

### Note:

$$\text{Scaling} = \frac{\text{reported SAR}}{\text{measured SAR}} = \frac{P_2(\text{mW})}{P_1(\text{mW})} = 10^{\left(\frac{P_2 - P_1}{10}\right)} (\text{dBm})$$

$$\text{Reported SAR} = \text{measured SAR} * (\text{scaling})$$

Where P2 is maximum specified power, P1 is measured conducted power

## 2.4 Reporting statements of conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

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### 3. Simultaneous Transmission Analysis

#### Simultaneous Transmission Scenarios:

| Simultaneous Transmit Configurations | Body |
|--------------------------------------|------|
| 2.4GHz WLAN MIMO                     | Yes  |
| 5GHz WLAN MIMO                       | Yes  |
| 6E WLAN MIMO                         | Yes  |
| BT + 2.4GHz WLAN Main                | Yes  |
| BT + 5GHz WLAN Main                  | Yes  |
| BT + 6E WLAN Main                    | Yes  |
| BT + 5GHz WLAN MIMO                  | Yes  |
| BT + 6E WLAN MIMO                    | Yes  |

#### Note:

1. Bluetooth and WLAN Aux share the same antenna path, and BT can transmit with WLAN Main simultaneously.
2. For 2.4/5/6GHz WLAN Main and Aux antennas, the maximum output power of each antenna during simultaneous transmission is the same with (or less than) that used in standalone transmission, and we used the sum of 1-g SAR provision in KDB447498D01 to exclude the simultaneous transmitted SAR measurement.

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### 3.1 Estimated SAR calculation

According to KDB447498 D01v06 – When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$$\text{Estimated SAR} = \frac{\text{Max. tune up power (mW)}}{\text{Min. test separation distance(mm)}} \times \frac{\sqrt{f(\text{GHz})}}{7.5}$$

If the minimum test separation distance is < 5mm, a distance of 5mm is used for estimated SAR calculation. When the test separation distance is >50mm, the 0.4W/kg is used for SAR-1g.

### 3.2 SPLSR evaluation and analysis

Per KDB447498D01, when the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR sum to peak location separation ratio(SPLSR).

The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion.

The ratio is determined by  $(\text{SAR1} + \text{SAR2})^{1.5}/R_i$ , rounded to two decimal digits, and must be  $\leq 0.04$  for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

SAR1 and SAR2 are the highest reported or estimated SAR for each antenna in the pair, and  $R_i$  is the separation distance between the peak SAR locations for the antenna pair in mm.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna.

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## Simultaneous Transmission Combination

The simultaneous Transmission conditions (Notebook mode)

| Exposure position<br>1g(W/kg) | 1                      | 2                     | 3                    | 4                   | 5                    | 6                   | 7           |
|-------------------------------|------------------------|-----------------------|----------------------|---------------------|----------------------|---------------------|-------------|
|                               | WLAN<br>2.4GHz<br>Main | WLAN<br>2.4GHz<br>Aux | WLAN<br>5GHz<br>Main | WLAN<br>5GHz<br>Aux | WLAN<br>6GHz<br>Main | WLAN<br>6GHz<br>Aux | BT<br>(Aux) |
| Bottom Surface                | 0.257                  | 0.336                 | 1.060                | 1.084               | 0.404                | 0.307               | 0.021       |

| Exposure position<br>1g(W/kg) | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Scenario 5   | Scenario 6 | Scenario 7 | Scenario 8   | SPLSR                |
|-------------------------------|------------|------------|------------|------------|--------------|------------|------------|--------------|----------------------|
|                               | 1+2<br>Sum | 1+7<br>Sum | 3+4<br>Sum | 3+7<br>Sum | 3+4+7<br>Sum | 5+6<br>Sum | 5+7<br>Sum | 5+6+7<br>Sum |                      |
| Bottom Surface                | 0.593      | 0.278      | 2.144      | 1.081      | 2.165        | 0.711      | 0.425      | 0.732        | Analyzed<br>as below |

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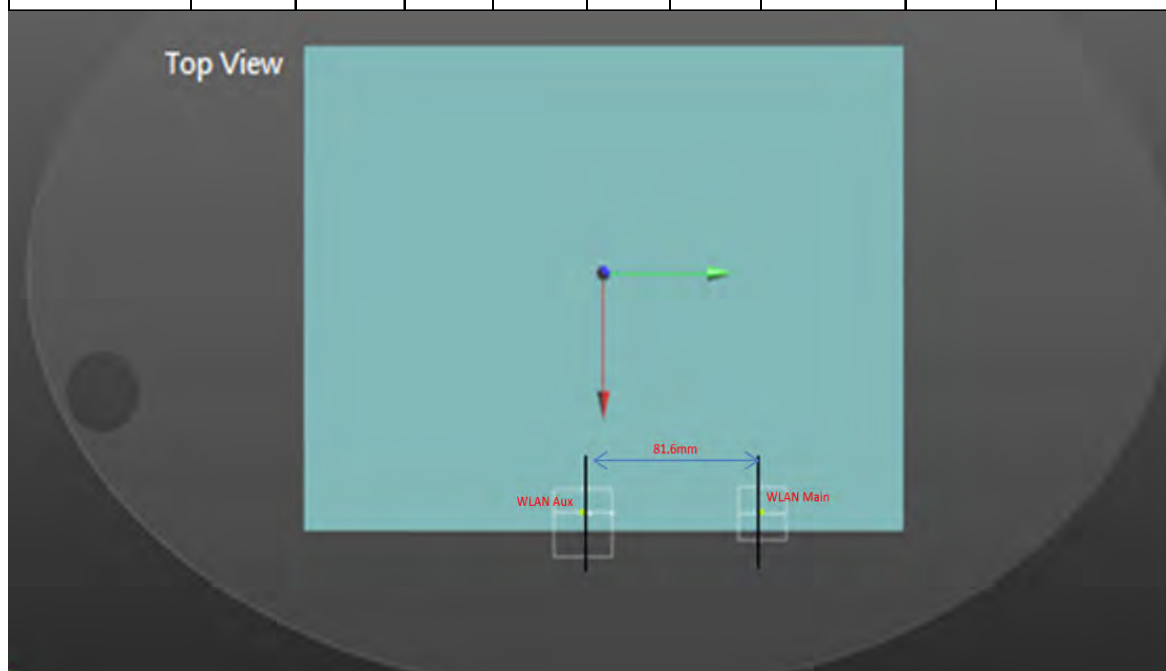
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## WLAN 5Gz MIMO

| Conditions   | Position       | SAR Value (W/kg) | Coordinates (cm) |       |       | $\Sigma$ SAR (W/kg) | Peak Location Separation Distance (mm) | SPLSR | Simultaneous Transmission SAR Test |
|--------------|----------------|------------------|------------------|-------|-------|---------------------|----------------------------------------|-------|------------------------------------|
|              |                |                  | x                | y     | z     |                     |                                        |       |                                    |
| WLAN 5G Main | Bottom Surface | 1.060            | 10.82            | 8.02  | -0.39 | 2.144               | 81.60                                  | 0.038 | SPLSR $\leq$ 0.04, Not required    |
| WLAN 5G Aux  |                | 1.084            | 10.82            | -0.14 | -0.43 |                     |                                        |       |                                    |



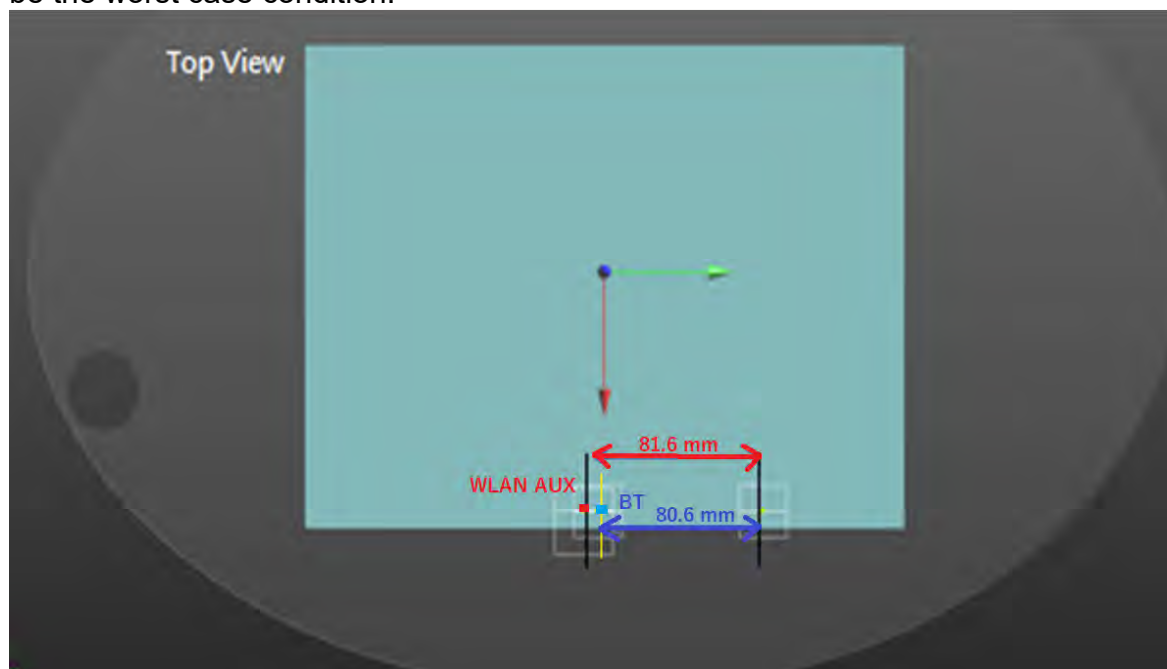
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## WLAN 5G MIMO + Bluetooth

| Conditions     | Position       | SAR Value (W/kg) | Coordinates (cm) |       |       | $\Sigma$ SAR (W/kg) | Peak Location Separation Distance (mm) | SPLSR | Simultaneous Transmission SAR Test |
|----------------|----------------|------------------|------------------|-------|-------|---------------------|----------------------------------------|-------|------------------------------------|
|                |                |                  | x                | y     | z     |                     |                                        |       |                                    |
| WLAN 5G Main   | Bottom Surface | 1.060            | 10.82            | 8.02  | -0.39 | 2.165               | 80.61                                  | 0.040 | SPLSR $\leq$ 0.04, Not required    |
| WLAN 5G Aux+BT |                | 1.105            | 10.94            | -0.04 | -0.43 |                     |                                        |       |                                    |

\*For peak SAR location of WLAN Aux + BT, using the peak SAR location with smallest separation distance between WLAN Main - WLAN Aux pair and WLAN Main - BT pair to be the worst case condition.



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## 4. Instruments List

| Manufacturer | Device                       | Type             | Serial number | Date of last calibration | Date of next calibration |
|--------------|------------------------------|------------------|---------------|--------------------------|--------------------------|
| SPEAG        | Dosimetric E-Field Probe     | EX3DV4           | 7642          | Mar.19,2021              | Mar.18,2022              |
|              |                              | EX3DV4           | 7466          | Jan.29,2021              | Jan.28,2022              |
|              |                              | EUmmWV4          | 9548          | Jan.28,2021              | Jan.27,2022              |
| SPEAG        | System Validation Dipole     | D2450V2          | 727           | Apr.14,2021              | Apr.13,2022              |
|              |                              | D5GHzV2          | 1023          | Jan.26,2021              | Jan.25,2022              |
|              |                              | D6.5GHzV2        | 1006          | Aug.21,2020              | Aug.20,2021              |
|              |                              | D7GHzV2          | 1007          | Aug.21,2020              | Aug.20,2021              |
|              |                              | 5G-Veri10        | 1021          | Jan.18,2021              | Jan.17,2022              |
| SPEAG        | Data acquisition Electronics | DAE4             | 856           | Apr.23,2021              | Apr.22,2022              |
|              |                              |                  | 877           | Mar.22,2021              | Mar.21,2022              |
| SPEAG        | Software                     | DASY 52 V52.10.4 | N/A           | Calibration not required | Calibration not required |
| SPEAG        | Phantom                      | ELI              | N/A           | Calibration not required | Calibration not required |
|              |                              | mmWave           |               |                          |                          |
| SPEAG        | Dielectric Assessment Kit    | DAKS-3.5         | 1053          | Feb.17,2021              | Feb.16,2022              |
| Agilent      | Dual-directional coupler     | 772D             | MY52180142    | Oct.06,2020              | Oct.05,2021              |
|              |                              | 778D             | MY52180302    | Oct.06,2020              | Oct.05,2021              |
| Agilent      | Signal Generator             | N5181A           | MY50145142    | Dec.27,2020              | Dec.26,2021              |
| Agilent      | Power Meter                  | E4417A           | MY52200004    | Oct.18,2020              | Oct.17,2021              |
| Agilent      | Power Sensor                 | E9301H           | MY52240003    | Oct.18,2020              | Oct.17,2021              |
|              |                              |                  | MY52200003    | Oct.18,2020              | Oct.17,2021              |
| TECPEL       | Digital thermometer          | DTM-303A         | TP190085      | Dec.22,2020              | Dec.14,2021              |

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| Manufacturer | Device                   | Type    | Serial number          | Date of last calibration | Date of next calibration |
|--------------|--------------------------|---------|------------------------|--------------------------|--------------------------|
| Anritsu      | Radio Communication Test | MT8821C | 6262044739             | Dec.02.2020              | Dec.01.2021              |
| R&S          | Power Sensor             | NRP18S  | 1429.0029K02-101973-em | Jun.24.2020              | Jun.23.2021              |

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## 5. Measurements

Date: 2021/6/28

Report No. :EN/2021/40017

**WLAN 802.11b, Body, Bottom Surface, CH 11, Main, 0mm**

Communication System: WLAN 2.4G; Frequency: 2462 MHz; Duty cycle= 1:1.037

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.816 \text{ S/m}$ ;  $\epsilon_r = 39.082$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 22.0°C; Liquid temperature: 22.2°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(8.16, 8.16, 8.16) @ 2462 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (51x101x1):** Interpolated grid:  $dx=12 \text{ mm}$ ,  $dy=12 \text{ mm}$ 

Maximum value of SAR (interpolated) = 0.379 W/kg

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$ 

Reference Value = 3.884 V/m; Power Drift = 0.06 dB

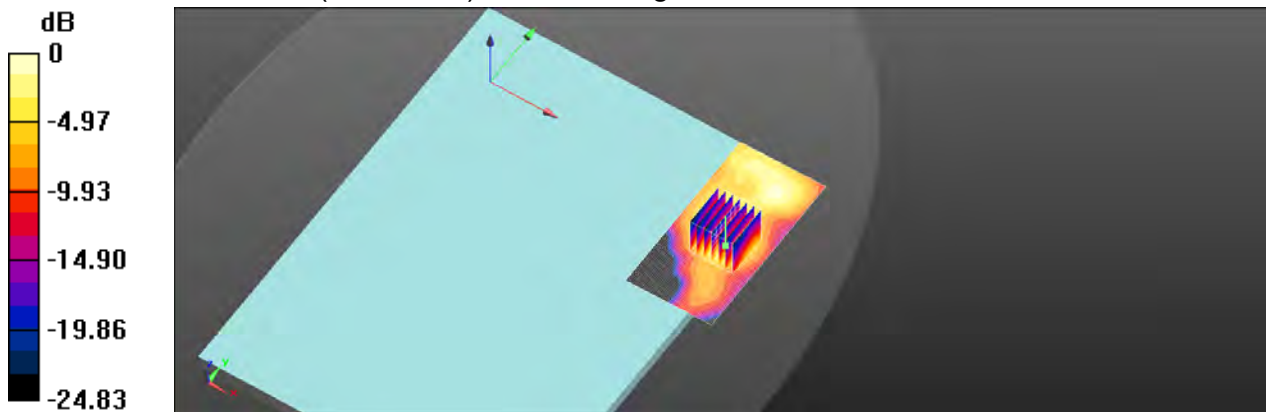
Peak SAR (extrapolated) = 0.538 W/kg

**SAR(1 g) = 0.240 W/kg; SAR(10 g) = 0.107 W/kg**

Smallest distance from peaks to all points 3 dB below = 9.2 mm

Ratio of SAR at M2 to SAR at M1 = 45.6%

Maximum value of SAR (measured) = 0.385 W/kg



0 dB = 0.385 W/kg = -4.15 dBW/kg

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Date: 2021/6/28

Report No. :EN/2021/40017

**WLAN 802.11ac(80M) 5.2G, Body, Bottom Surface, CH 42, Main, 0mm**

Communication System: WLAN 5G; Frequency: 5210 MHz; Duty cycle= 1:1.075

Medium parameters used:  $f = 5210 \text{ MHz}$ ;  $\sigma = 4.603 \text{ S/m}$ ;  $\epsilon_r = 35.774$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.9°C; Liquid temperature: 22.1°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5210 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 1.51 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 7.663 V/m; Power Drift = 0.03 dB

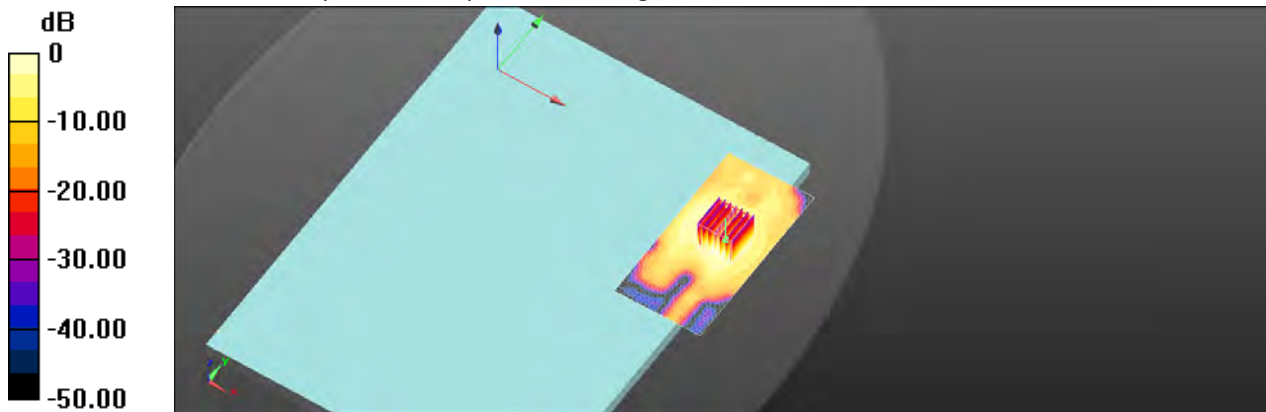
Peak SAR (extrapolated) = 2.97 W/kg

**SAR(1 g) = 0.828 W/kg; SAR(10 g) = 0.287 W/kg**

Smallest distance from peaks to all points 3 dB below = 8.4 mm

Ratio of SAR at M2 to SAR at M1 = 56.9%

Maximum value of SAR (measured) = 1.59 W/kg



0 dB = 1.59 W/kg = 2.01 dBW/kg

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Date: 2021/6/29

Report No. :EN/2021/40017

**WLAN 802.11ax(80M) 5.3G, Body, Bottom Surface, CH 58, Main, 0mm**

Communication System: WLAN 5G; Frequency: 5290 MHz; Duty cycle= 1:1.042

Medium parameters used:  $f = 5290 \text{ MHz}$ ;  $\sigma = 4.717 \text{ S/m}$ ;  $\epsilon_r = 35.566$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.7°C; Liquid temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5290 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 1.20 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 5.248 V/m; Power Drift = 0.05 dB

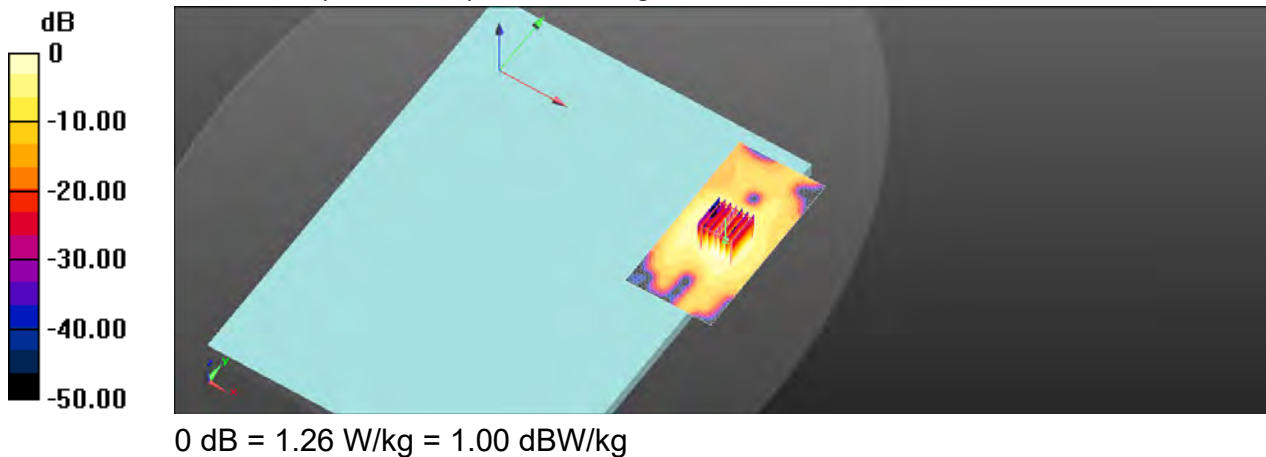
Peak SAR (extrapolated) = 2.37 W/kg

**SAR(1 g) = 0.656 W/kg; SAR(10 g) = 0.230 W/kg**

Smallest distance from peaks to all points 3 dB below = 8.8 mm

Ratio of SAR at M2 to SAR at M1 = 56.1%

Maximum value of SAR (measured) = 1.26 W/kg



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**WLAN 802.11ac(80M) 5.6G, Body, Bottom Surface, CH 138, Main, 0mm**

Communication System: WLAN 5G; Frequency: 5690 MHz; Duty cycle= 1:1.075

Medium parameters used:  $f = 5690 \text{ MHz}$ ;  $\sigma = 5.183 \text{ S/m}$ ;  $\epsilon_r = 34.691$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 22.1°C; Liquid temperature: 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.2, 5.2, 5.2) @ 5690 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) = 2.57 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

Reference Value = 9.058 V/m; Power Drift = 0.01 dB

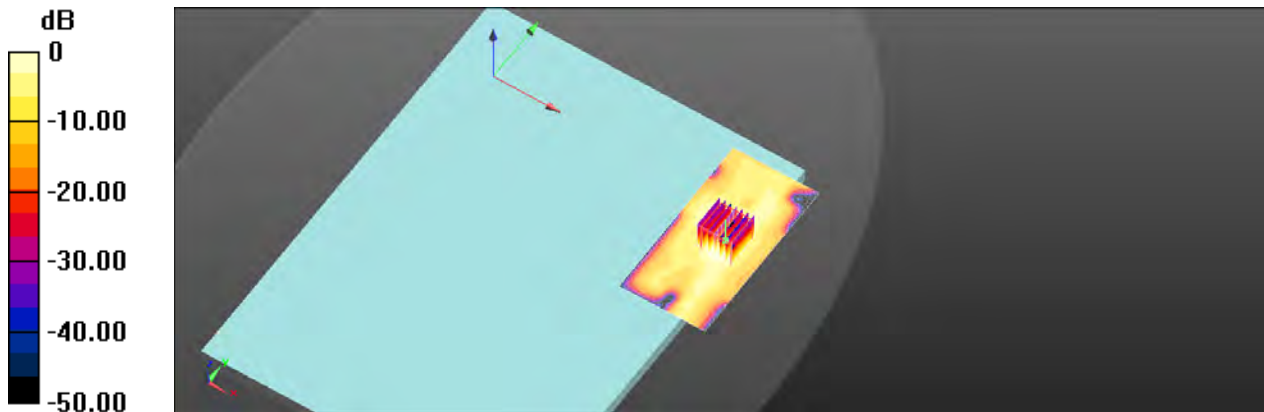
Peak SAR (extrapolated) = 4.12 W/kg

**SAR(1 g) = 0.979 W/kg; SAR(10 g) = 0.323 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.2 mm

Ratio of SAR at M2 to SAR at M1 = 52.2%

Maximum value of SAR (measured) = 1.97 W/kg



0 dB = 1.97 W/kg = 2.94 dBW/kg

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**WLAN 802.11ac(80M) 5.8G, Body, Bottom Surface, CH 155, Main, 0mm**

Communication System: WLAN 5G; Frequency: 5775 MHz; Duty cycle= 1:1.075

Medium parameters used:  $f = 5775 \text{ MHz}$ ;  $\sigma = 5.285 \text{ S/m}$ ;  $\epsilon_r = 34.544$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.8°C; Liquid temperature: 22.0°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.2, 5.2, 5.2) @ 5775 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) = 1.80 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

Reference Value = 8.067 V/m; Power Drift = 0.04 dB

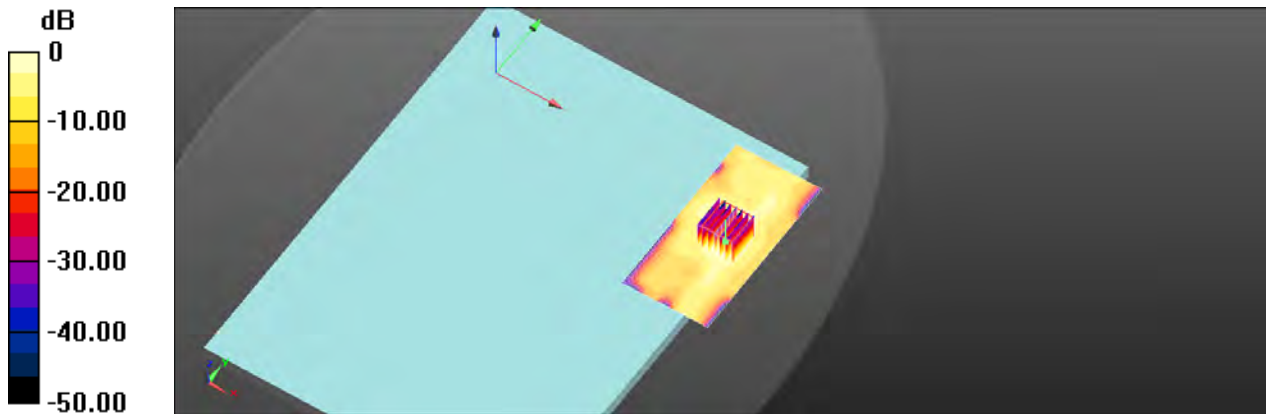
Peak SAR (extrapolated) = 3.81 W/kg

**SAR(1 g) = 0.910 W/kg; SAR(10 g) = 0.302 W/kg**

Smallest distance from peaks to all points 3 dB below = 8 mm

Ratio of SAR at M2 to SAR at M1 = 51.8%

Maximum value of SAR (measured) = 1.83 W/kg



0 dB = 1.83 W/kg = 2.62 dBW/kg

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Date: 2021/6/28

Report No. :EN/2021/40017

**WLAN 802.11b, Body, Bottom Surface, CH 11, Aux, 0mm**

Communication System: WLAN 2.4G; Frequency: 2462 MHz; Duty cycle= 1:1.035

Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.816 \text{ S/m}$ ;  $\epsilon_r = 39.082$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 22.0°C; Liquid temperature: 22.2°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(8.16, 8.16, 8.16) @ 2462 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (51x101x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.464 W/kg

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.924 V/m; Power Drift = 0.13 dB

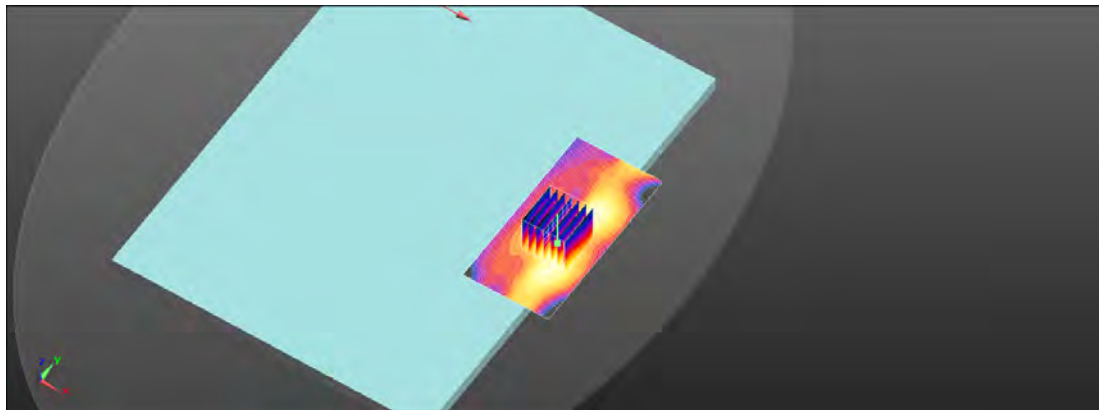
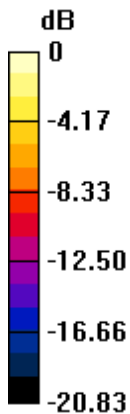
Peak SAR (extrapolated) = 0.721 W/kg

**SAR(1 g) = 0.315 W/kg; SAR(10 g) = 0.149 W/kg**

Smallest distance from peaks to all points 3 dB below = 10.4 mm

Ratio of SAR at M2 to SAR at M1 = 43.9%

Maximum value of SAR (measured) = 0.497 W/kg



0 dB = 0.497 W/kg = -3.04 dBW/kg

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Date: 2021/6/28

Report No. :EN/2021/40017

**Bluetooth(GFSK), Body, Bottom Surface, CH 78, 0mm**

Communication System: Bluetooth; Frequency: 2480 MHz; Duty cycle= 1:1.339

Medium parameters used:  $f = 2480$  MHz;  $\sigma = 1.831$  S/m;  $\epsilon_r = 39.036$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient temperature: 22.0°C; Liquid temperature: 22.2°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(8.16, 8.16, 8.16) @ 2480 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (51x101x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.0411 W/kg

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.205 V/m; Power Drift = 0.17 dB

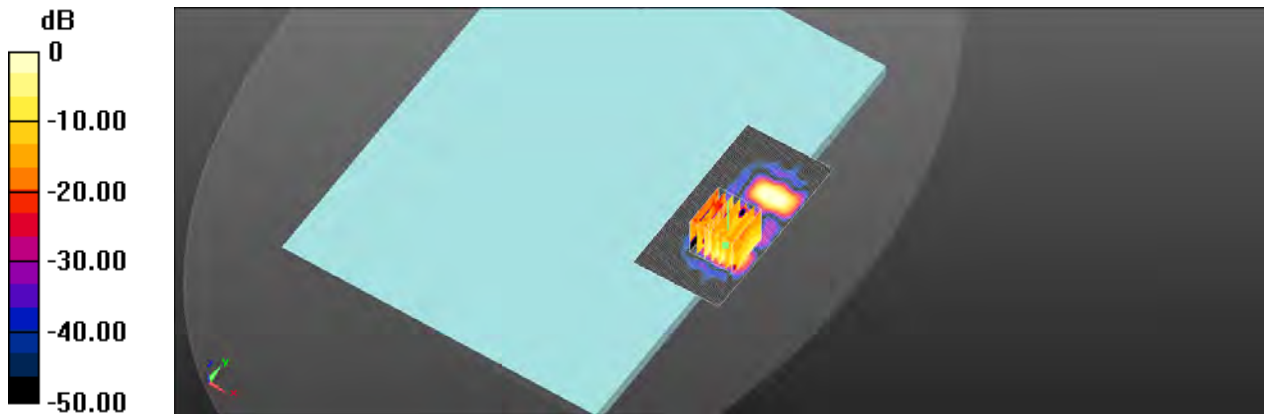
Peak SAR (extrapolated) = 0.0830 W/kg

**SAR(1 g) = 0.015 W/kg; SAR(10 g) = 0.00487 W/kg**

Smallest distance from peaks to all points 3 dB below: Larger than measurement grid

Ratio of SAR at M2 to SAR at M1 = 36.5%

Maximum value of SAR (measured) = 0.0320 W/kg



0 dB = 0.0320 W/kg = -14.95 dBW/kg

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Report No. :EN/2021/40017

**WLAN 802.11ac(80M) 5.2G, Body, Bottom Surface, CH 42, Aux, 0mm**

Communication System: WLAN 5G; Frequency: 5210 MHz; Duty cycle= 1:1.081

Medium parameters used:  $f = 5210 \text{ MHz}$ ;  $\sigma = 4.603 \text{ S/m}$ ;  $\epsilon_r = 35.774$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.9°C; Liquid temperature: 22.1°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5210 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) = 1.36 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

Reference Value = 5.826 V/m; Power Drift = 0.09 dB

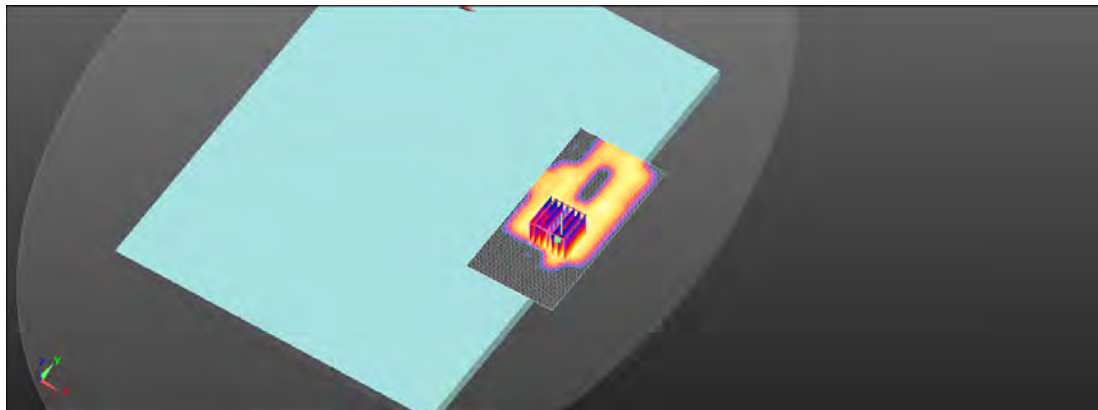
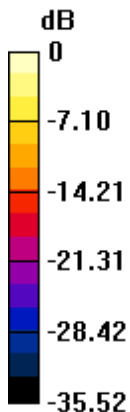
Peak SAR (extrapolated) = 2.51 W/kg

**SAR(1 g) = 0.649 W/kg; SAR(10 g) = 0.200 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.9 mm

Ratio of SAR at M2 to SAR at M1 = 54.8%

Maximum value of SAR (measured) = 1.28 W/kg



0 dB = 1.28 W/kg = 1.07 dBW/kg

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**WLAN 802.11ac(80M) 5.3G, Body, Bottom Surface, CH 58, Aux, 0mm**

Communication System: WLAN 5G; Frequency: 5290 MHz; Duty cycle= 1:1.081

Medium parameters used:  $f = 5290 \text{ MHz}$ ;  $\sigma = 4.717 \text{ S/m}$ ;  $\epsilon_r = 35.566$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.7°C; Liquid temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5290 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) = 1.29 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

Reference Value = 6.628 V/m; Power Drift = 0.06 dB

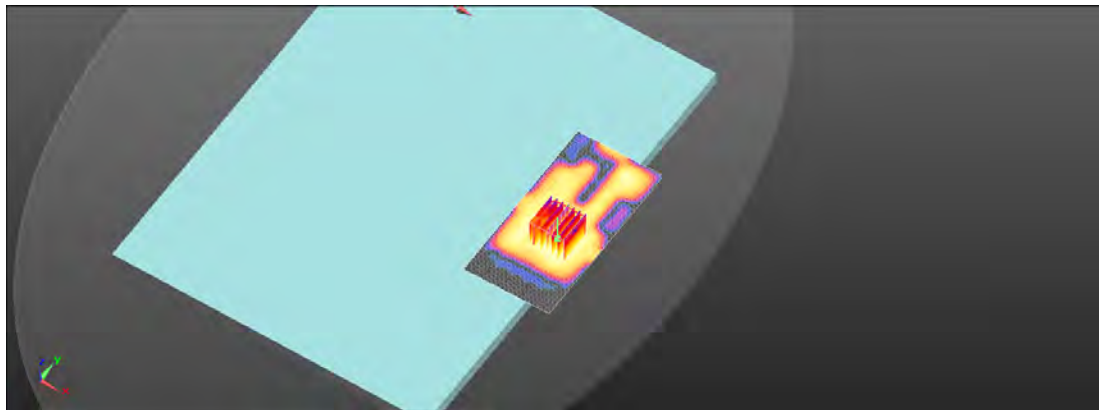
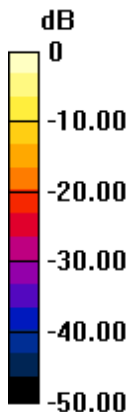
Peak SAR (extrapolated) = 2.81 W/kg

**SAR(1 g) = 0.705 W/kg; SAR(10 g) = 0.225 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.6 mm

Ratio of SAR at M2 to SAR at M1 = 53.9%

Maximum value of SAR (measured) = 1.39 W/kg



0 dB = 1.39 W/kg = 1.43 dBW/kg

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**WLAN 802.11ac(80M) 5.6G, Body, Bottom Surface, CH 138, Aux, 0mm**

Communication System: WLAN 5G; Frequency: 5690 MHz; Duty cycle= 1:1.081

Medium parameters used:  $f = 5690 \text{ MHz}$ ;  $\sigma = 5.183 \text{ S/m}$ ;  $\epsilon_r = 34.691$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 22.1°C; Liquid temperature: 22.3°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.2, 5.2, 5.2) @ 5690 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) = 1.88 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

Reference Value = 8.507 V/m; Power Drift = 0.02 dB

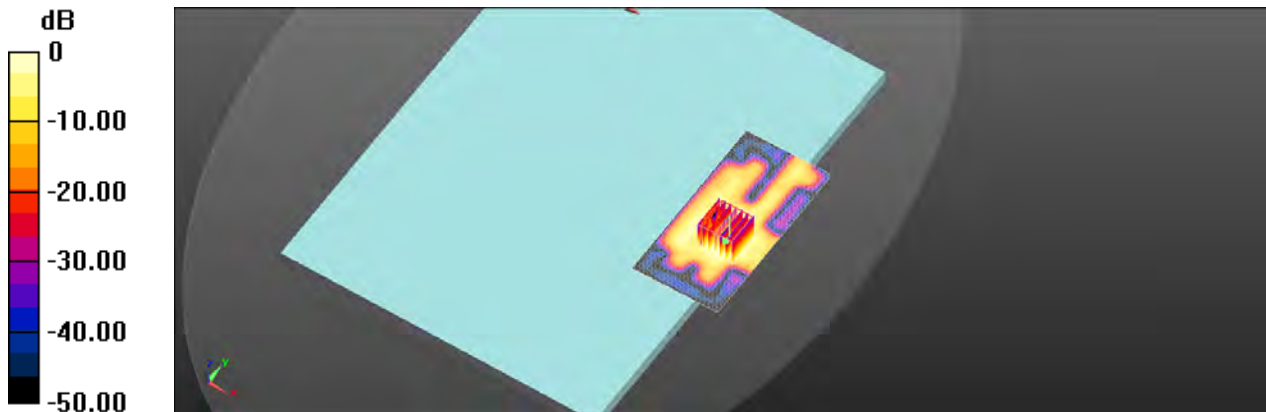
Peak SAR (extrapolated) = 4.26 W/kg

**SAR(1 g) = 0.983 W/kg; SAR(10 g) = 0.321 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 51.6%

Maximum value of SAR (measured) = 1.89 W/kg



0 dB = 1.89 W/kg = 2.76 dBW/kg

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**WLAN 802.11ac(80M) 5.8G, Body, Bottom Surface, CH 155, Aux, 0mm**

Communication System: WLAN 5G; Frequency: 5775 MHz; Duty cycle= 1:1.081

Medium parameters used:  $f = 5775 \text{ MHz}$ ;  $\sigma = 5.285 \text{ S/m}$ ;  $\epsilon_r = 34.544$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature: 21.8°C; Liquid temperature: 22.0°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.2, 5.2, 5.2) @ 5775 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (61x121x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 1.91 W/kg

**Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 9.372 V/m; Power Drift = 0.01 dB

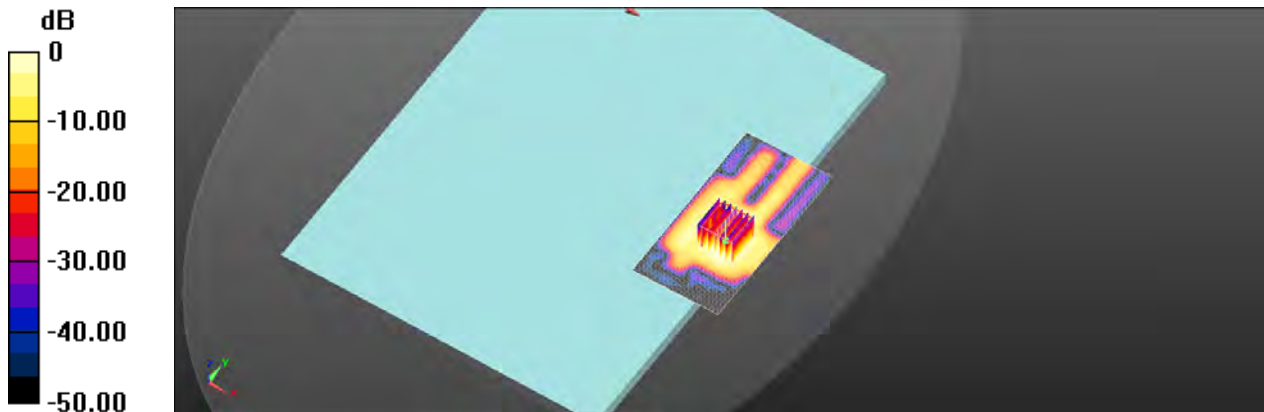
Peak SAR (extrapolated) = 4.32 W/kg

**SAR(1 g) = 1.000 W/kg; SAR(10 g) = 0.326 W/kg**

Smallest distance from peaks to all points 3 dB below = 7.4 mm

Ratio of SAR at M2 to SAR at M1 = 51.1%

Maximum value of SAR (measured) = 1.96 W/kg



0 dB = 1.96 W/kg = 2.92 dBW/kg

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Report No. : EN/2021/40017

Measurement Report for Device, BACK, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 15 (6025.0 MHz)\_Main

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-5 | WLAN, 10755-AAC | 6025.0, 15                      | 5.7               | 5.59                   | 34.5             |

## Hardware Setup

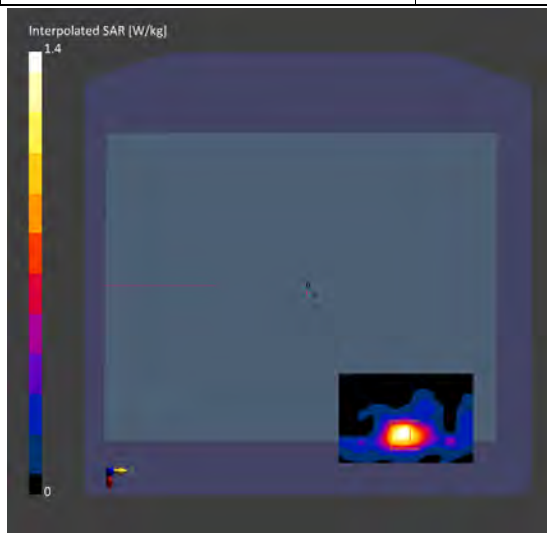
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 10:35 | 2021-06-27, 10:47 |
| psSAR1g [W/Kg]      | 0.292             | 0.326             |
| psSAR10g [W/Kg]     | 0.101             | 0.107             |
| Power Drift [dB]    | -0.01             | 0.10              |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 54.2              |
| Dist 3dB Peak [mm]  |                   | 7.8               |



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Report No. : EN/2021/40017

Measurement Report for Device, BACK, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 47 (6185.0 MHz)\_Main

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-5 | WLAN, 10755-AAC | 6185.0, 47                      | 5.7               | 5.75                   | 34.4             |

## Hardware Setup

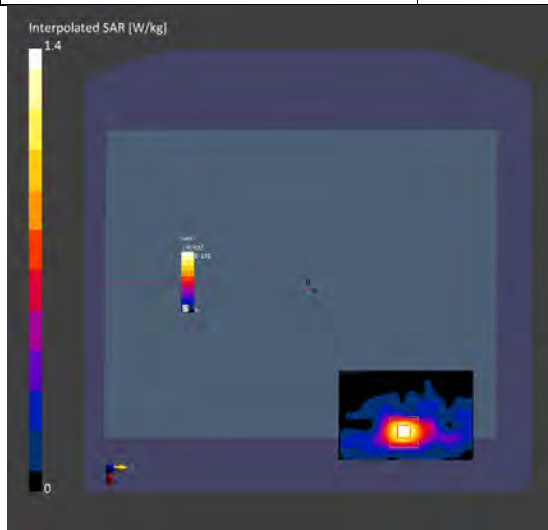
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 11:01 | 2021-06-27, 11:12 |
| psSAR1g [W/Kg]      | 0.269             | 0.317             |
| psSAR10g [W/Kg]     | 0.090             | 0.101             |
| Power Drift [dB]    | -0.06             | -0.08             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 52.7              |
| Dist 3dB Peak [mm]  |                   | 7.5               |



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Report No. :EN/2021/40017  
Measurement Report for Device, BACK, U-NII-6, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 111 (6505.0 MHz)\_Main

#### Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Flat, HSL            | BACK, 2.00                   | U-NII-6 | WLAN, 10755-AAC | 6505.0, 111                     | 5.7               | 6.11                   | 34.0             |

#### Hardware Setup

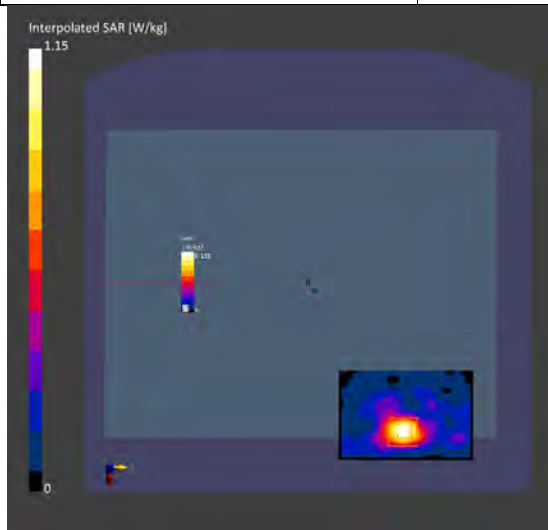
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

#### Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 11:37 | 2021-06-27, 11:48 |
| psSAR1g [W/Kg]      | 0.210             | 0.241             |
| psSAR10g [W/Kg]     | 0.072             | 0.081             |
| Power Drift [dB]    | -0.17             | 0.12              |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 51.9              |
| Dist 3dB Peak [mm]  |                   | 8.2               |



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Report No. :EN/2021/40017  
Measurement Report for Device, BACK, U-NII-7, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 175 (6825.0 MHz)\_Main

#### Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-7 | WLAN, 10755-AAC | 6825.0, 175                     | 5.7               | 6.42                   | 33.6             |

#### Hardware Setup

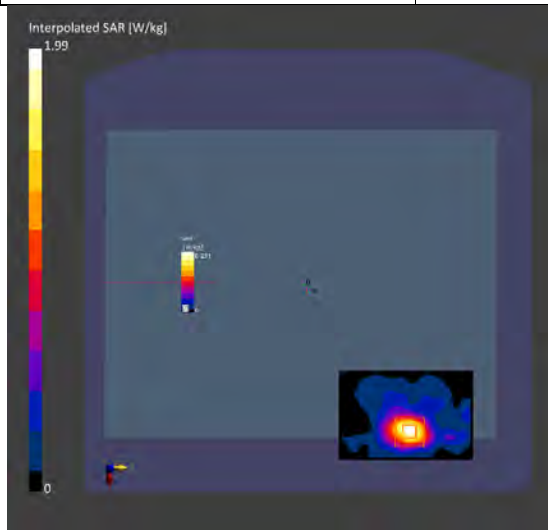
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

#### Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 12:22 | 2021-06-27, 12:41 |
| psSAR1g [W/Kg]      | 0.370             | 0.402             |
| psSAR10g [W/Kg]     | 0.125             | 0.133             |
| Power Drift [dB]    | 0.04              | -0.04             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 50.8              |
| Dist 3dB Peak [mm]  |                   | 8.4               |



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Report No. : EN/2021/40017

Measurement Report for Device, BACK, U-NII-8, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 207 (6985.0 MHz)\_Main

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Flat, HSL            | BACK, 2.00                   | U-NII-8 | WLAN, 10755-AAC | 6985.0, 207                     | 5.85              | 6.60                   | 33.3             |

## Hardware Setup

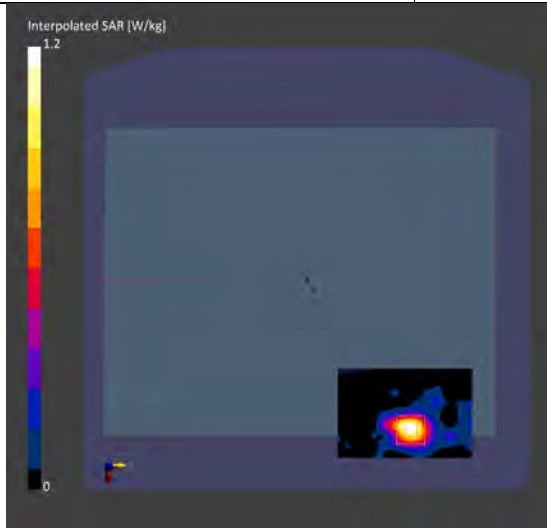
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 13:31 | 2021-06-27, 13:59 |
| psSAR1g [W/Kg]      | 0.216             | 0.238             |
| psSAR10g [W/Kg]     | 0.073             | 0.079             |
| Power Drift [dB]    | -0.04             | -0.15             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 45.6              |
| Dist 3dB Peak [mm]  |                   | 8.8               |



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Report No. :EN/2021/40017

Measurement Report for Device, BACK, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 15 (6025.0 MHz)\_Aux

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-5 | WLAN, 10755-AAC | 6025.0, 15                      | 5.7               | 5.59                   | 34.5             |

## Hardware Setup

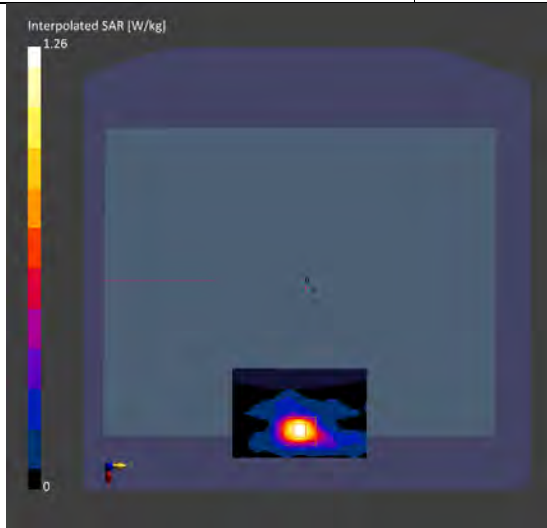
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 14:22 | 2021-06-27, 14:53 |
| psSAR1g [W/Kg]      | 0.253             | 0.297             |
| psSAR10g [W/Kg]     | 0.086             | 0.095             |
| Power Drift [dB]    | 0.08              | -0.04             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 53.7              |
| Dist 3dB Peak [mm]  |                   | 7.1               |



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Measurement Report for Device, BACK, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 47 (6185.0 MHz)\_Aux

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-5 | WLAN, 10755-AAC | 6185.0, 47                      | 5.7               | 5.75                   | 34.4             |

## Hardware Setup

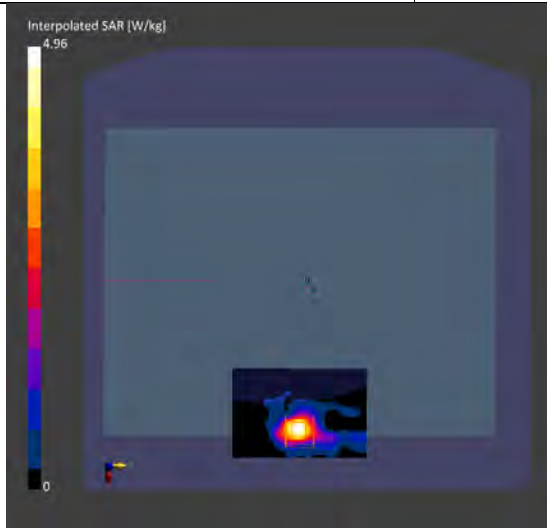
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 15:56 | 2021-06-27, 16:25 |
| psSAR1g [W/Kg]      | 0.255             | 0.274             |
| psSAR10g [W/Kg]     | 0.083             | 0.080             |
| Power Drift [dB]    | -0.04             | -0.04             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 53.0              |
| Dist 3dB Peak [mm]  |                   | 7.8               |



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Measurement Report for Device, BACK, U-NII-6, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 111 (6505.0 MHz)\_Aux

#### Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

|                      |                              |         |                 |                                 |                   |                        |                  |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | BACK, 2.00                   | U-NII-6 | WLAN, 10755-AAC | 6505.0, 111                     | 5.7               | 6.11                   | 34.0             |

#### Hardware Setup

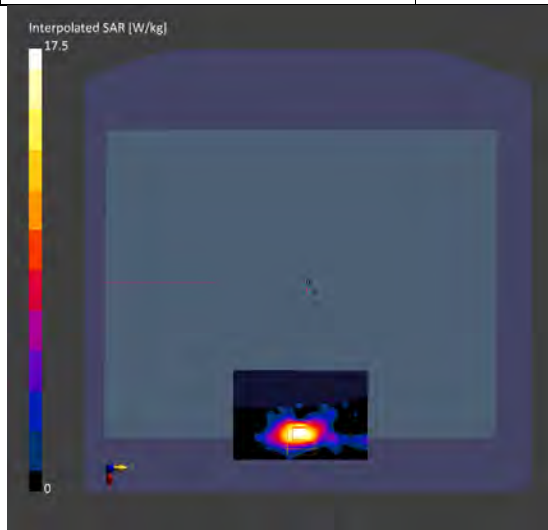
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

#### Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 17:04 | 2021-06-27, 17:21 |
| psSAR1g [W/Kg]      | 0.132             | 0.134             |
| psSAR10g [W/Kg]     | 0.044             | 0.043             |
| Power Drift [dB]    | 0.15              | -0.19             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 39.6              |
| Dist 3dB Peak [mm]  |                   | 7.3               |



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Report No. :EN/2021/40017

Measurement Report for Device, BACK, U-NII-7, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 175 (6825.0 MHz)\_Aux

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Flat, HSL            | BACK, 2.00                   | U-NII-7 | WLAN, 10755-AAC | 6825.0, 175                     | 5.7               | 6.42                   | 33.6             |

## Hardware Setup

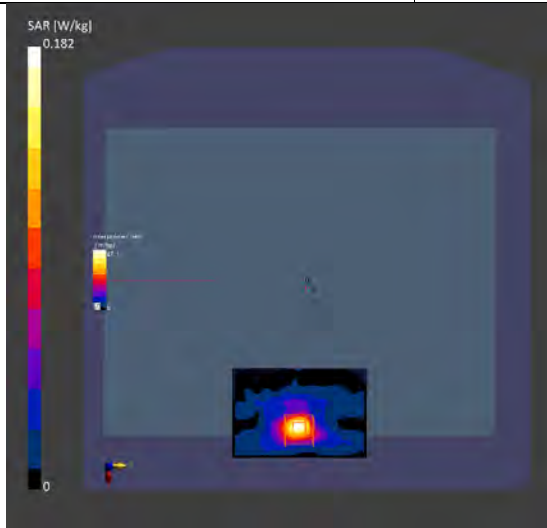
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 18:12 | 2021-06-27, 18:42 |
| psSAR1g [W/Kg]      | 0.290             | 0.289             |
| psSAR10g [W/Kg]     | 0.092             | 0.083             |
| Power Drift [dB]    | -0.05             | 0.08              |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 50.4              |
| Dist 3dB Peak [mm]  |                   | 7.5               |



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Report No. : EN/2021/40017

Measurement Report for Device, BACK, U-NII-8, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 207 (6985.0 MHz)\_Aux

## Device Under Test Properties

|                     |                       |      |          |
|---------------------|-----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
| Framework,          | 298.0 x 2350.0 x 13.0 |      | Laptop   |

## Exposure Conditions

| Phantom Section, TSL | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|------------------------------|---------|-----------------|---------------------------------|-------------------|------------------------|------------------|
| Flat, HSL            | BACK, 2.00                   | U-NII-8 | WLAN, 10755-AAC | 6985.0, 207                     | 5.85              | 6.60                   | 33.3             |

## Hardware Setup

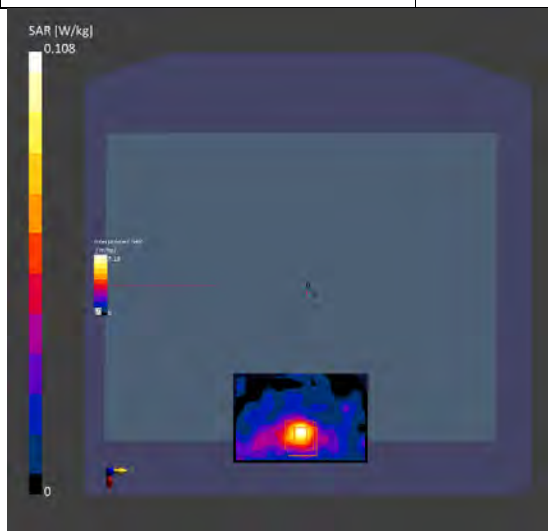
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan    | Zoom Scan          |
|---------------------|--------------|--------------------|
| Grid Extents [mm]   | 68.0 x 102.0 | 22.0 x 22.0 x 22.0 |
| Grid Steps [mm]     | 8.5 x 8.5    | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0          | 1.4                |
| Graded Grid         | Yes          | Yes                |
| Grading Ratio       | 1.5          | 1.4                |
| MAIA                | N/A          | N/A                |
| Surface Detection   | VMS + 6p     | VMS + 6p           |
| Scan Method         | Measured     | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 19:33 | 2021-06-27, 20:09 |
| psSAR1g [W/Kg]      | 0.159             | 0.163             |
| psSAR10g [W/Kg]     | 0.050             | 0.046             |
| Power Drift [dB]    | 0.17              | -0.16             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 48.8              |
| Dist 3dB Peak [mm]  |                   | 6.8               |



Report No. : EN/2021/40017

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## Measurement Report for Framework, Bottom, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 15 (6025.0 MHz)\_Main

## Device Under Test Properties

| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
|---------------------|----------------------|------|----------|
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| 5G Air          | Bottom, 2.00                 | U-NII-5 | WLAN, 10755-AAC | 6025.0, 15                      | 1.0               |

## Hardware Setup

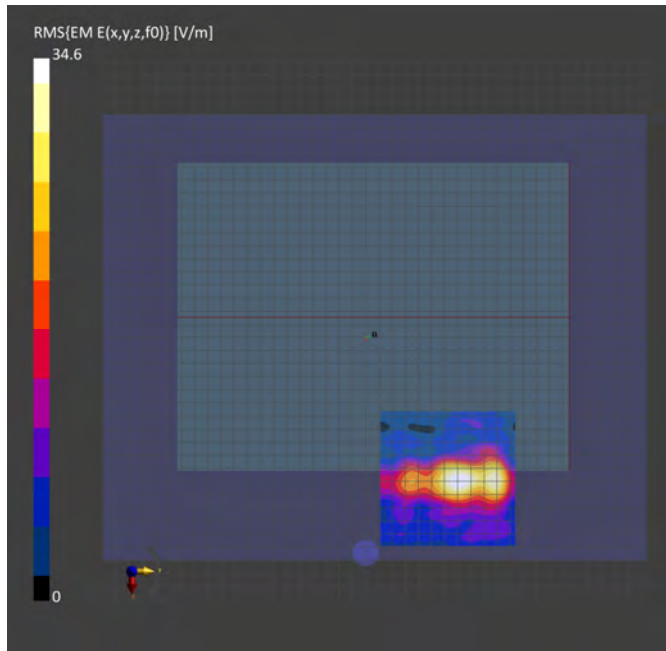
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
|---------------|--------|---------------------------------------|------------------------|
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

| Scan Type           | 5G Scan         |
|---------------------|-----------------|
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

| Scan Type                    | 5G Scan           |
|------------------------------|-------------------|
| Date                         | 2021-06-28, 17:14 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.24              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.29              |
| psPDmod+ [W/m <sup>2</sup> ] | 1.52              |
| E <sub>max</sub> [V/m]       | 34.6              |
| Power Drift [dB]             | -0.18             |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 47 (6185.0 MHz)\_Main

## Device Under Test Properties

| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
|---------------------|----------------------|------|----------|
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| 5G Air          | Bottom, 2.00                 | U-NII-5 | WLAN, 10755-AAC | 6185.0, 47                      | 1.0               |

## Hardware Setup

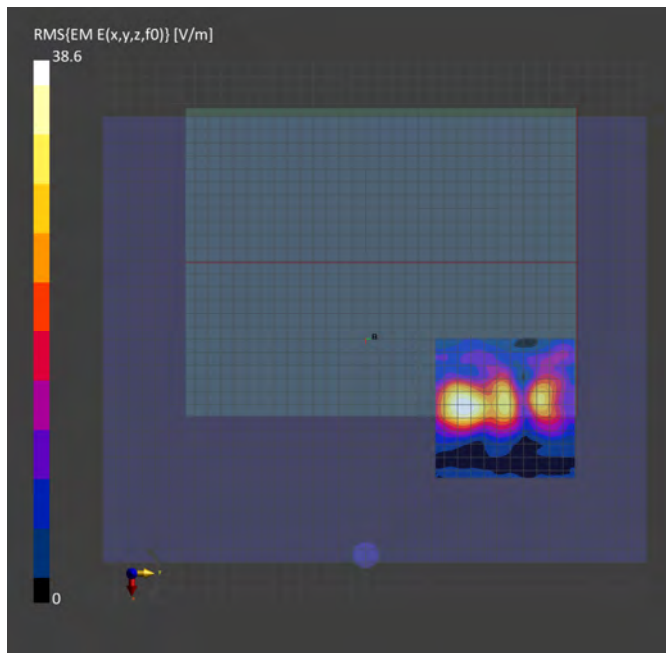
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
|---------------|--------|---------------------------------------|------------------------|
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

| Scan Type           | 5G Scan         |
|---------------------|-----------------|
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

| Scan Type                    | 5G Scan           |
|------------------------------|-------------------|
| Date                         | 2021-06-29, 16:54 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.85              |
| psPDtot+ [W/m <sup>2</sup> ] | 2.02              |
| psPDmod+ [W/m <sup>2</sup> ] | 2.12              |
| E <sub>max</sub> [V/m]       | 38.6              |
| Power Drift [dB]             | 0.01              |



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Measurement Report for Framework, Bottom, U-NII-6, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 111 (6505.0 MHz)\_Main

## Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-6 | WLAN, 10755-AAC | 6505.0, 111                     | 1.0               |

## Hardware Setup

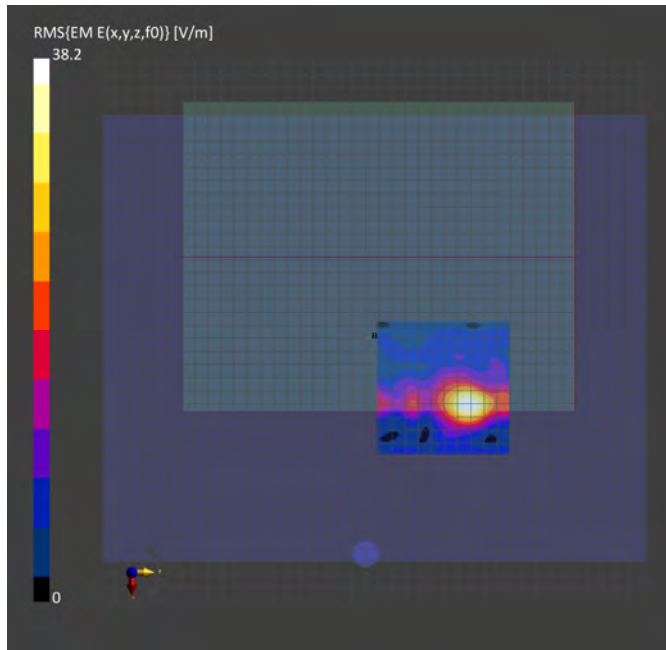
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-29, 21:00 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.54              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.65              |
| psPDmod+ [W/m <sup>2</sup> ] | 1.84              |
| E <sub>max</sub> [V/m]       | 38.2              |
| Power Drift [dB]             | 0.11              |



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Measurement Report for Framework, Bottom, U-NII-7, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 175 (6825.0 MHz)\_Main

## Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-7 | WLAN, 10755-AAC | 6825.0, 175                     | 1.0               |

## Hardware Setup

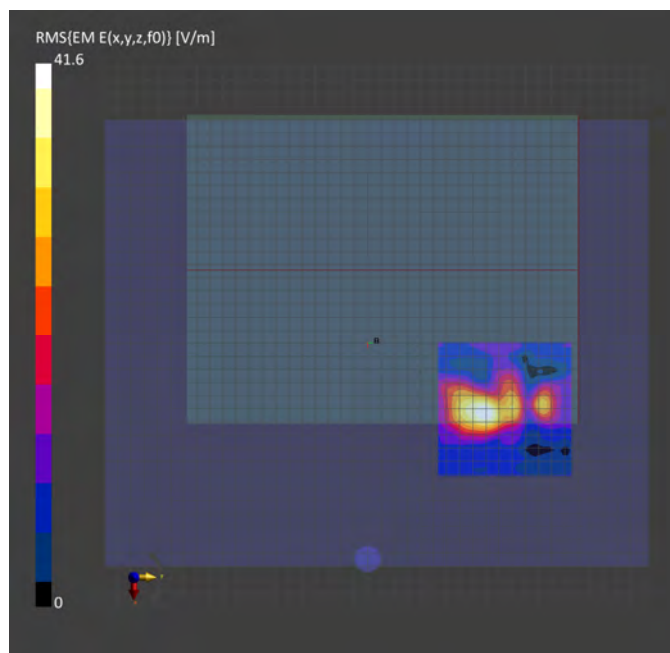
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 00:31 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 2.08              |
| psPDtot+ [W/m <sup>2</sup> ] | 2.19              |
| psPDmod+ [W/m <sup>2</sup> ] | 2.48              |
| E <sub>max</sub> [V/m]       | 41.6              |
| Power Drift [dB]             | 0.19              |



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Measurement Report for Framework, Bottom, U-NII-8, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 207 (6985.0 MHz)\_Main

## Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-8 | WLAN, 10755-AAC | 6985.0, 207                     | 1.0               |

## Hardware Setup

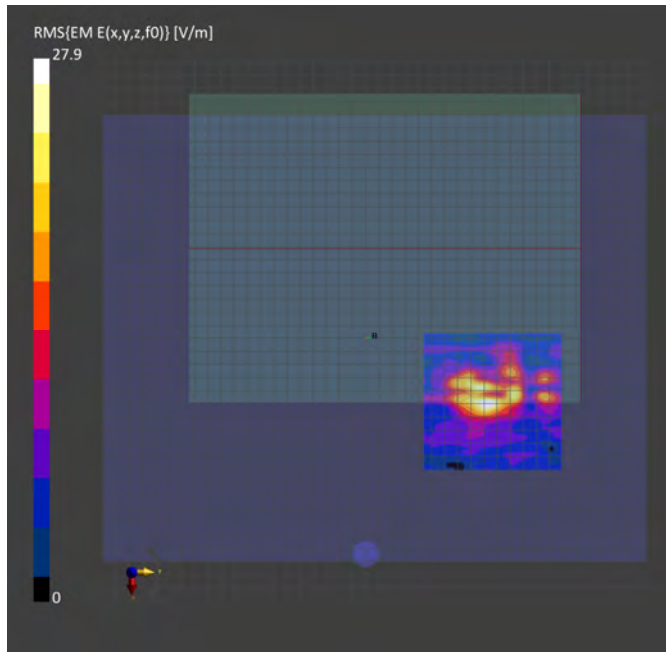
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 13:47 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 0.499             |
| psPDtot+ [W/m <sup>2</sup> ] | 0.722             |
| psPDmod+ [W/m <sup>2</sup> ] | 1.21              |
| E <sub>max</sub> [V/m]       | 27.9              |
| Power Drift [dB]             | -0.14             |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 15 (6025.0 MHz)\_Aux

#### Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-5 | WLAN, 10755-AAC | 6025.0, 15                      | 1.0               |

#### Hardware Setup

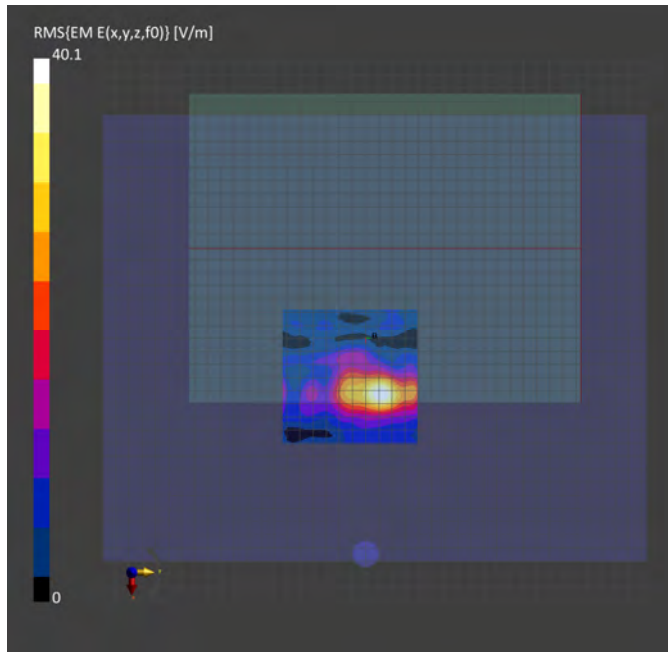
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

#### Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 15:51 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.64              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.73              |
| psPDmod+ [W/m <sup>2</sup> ] | 2.08              |
| E <sub>max</sub> [V/m]       | 40.1              |
| Power Drift [dB]             | -0.19             |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-5, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 47 (6185.0 MHz)\_Aux

## Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-5 | WLAN, 10755-AAC | 6185.0, 15                      | 1.0               |

## Hardware Setup

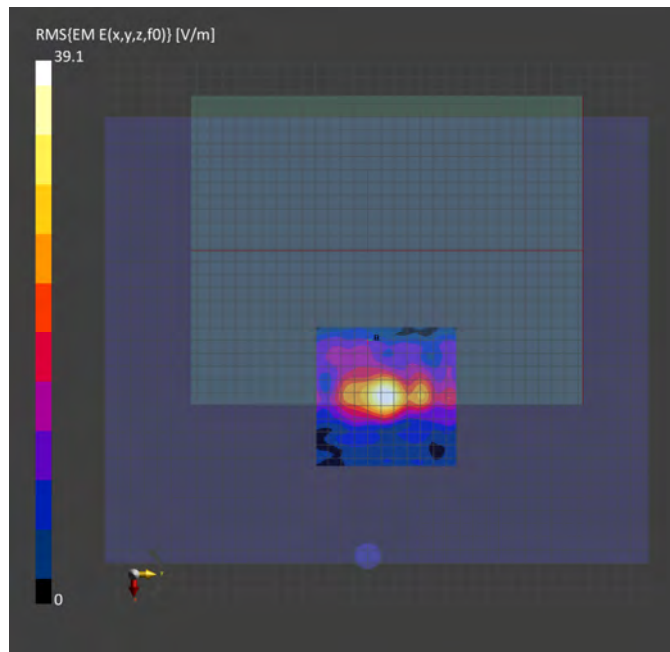
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 18:10 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.77              |
| psPDtot+ [W/m <sup>2</sup> ] | 2.09              |
| psPDmod+ [W/m <sup>2</sup> ] | 2.37              |
| E <sub>max</sub> [V/m]       | 39.1              |
| Power Drift [dB]             | 0.10              |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-6, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 111 (6505.0 MHz)\_Aux

#### Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-6 | WLAN, 10755-AAC | 6505.0, 111                     | 1.0               |

#### Hardware Setup

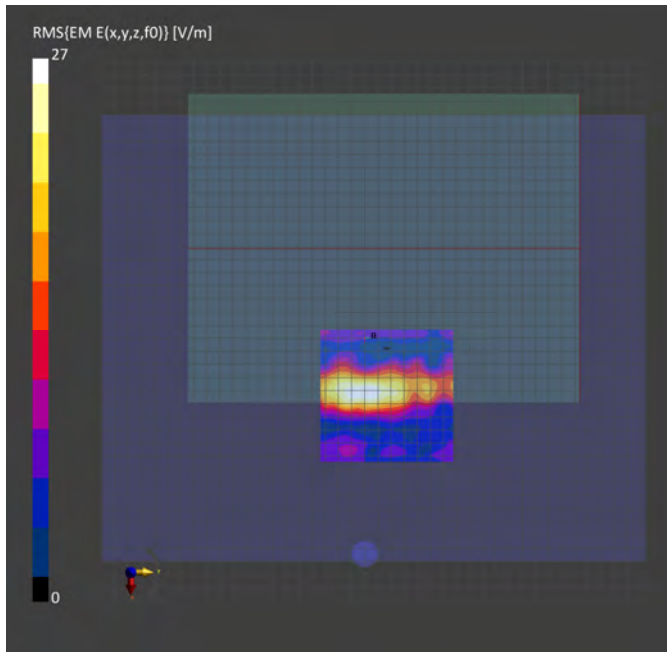
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

#### Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 20:36 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.10              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.17              |
| psPDmod+ [W/m <sup>2</sup> ] | 1.25              |
| E <sub>max</sub> [V/m]       | 27.0              |
| Power Drift [dB]             | -0.11             |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-7, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 175 (6825.0 MHz)\_Aux

## Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

## Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-7 | WLAN, 10755-AAC | 6825.0, 175                     | 1.0               |

## Hardware Setup

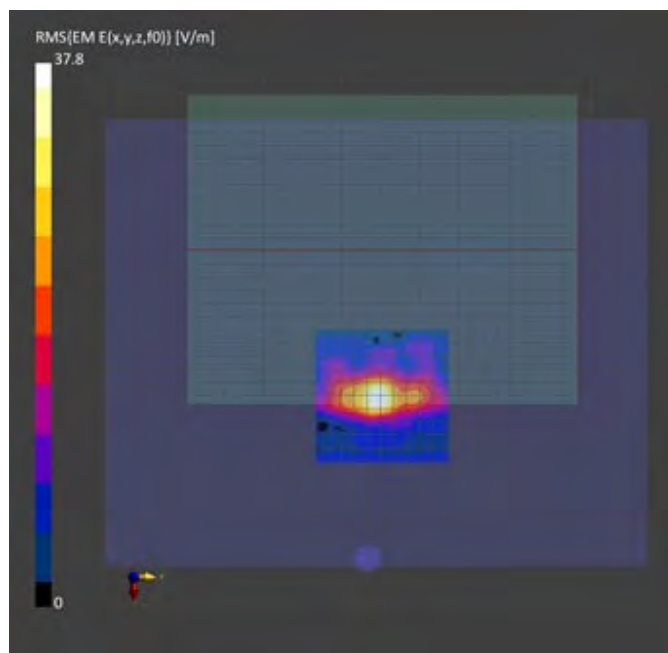
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

## Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-07-01, 10:36 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.56              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.65              |
| psPDmod+ [W/m <sup>2</sup> ] | 1.88              |
| E <sub>max</sub> [V/m]       | 37.8              |
| Power Drift [dB]             | -0.17             |



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Report No. : EN/2021/40017

Measurement Report for Framework, Bottom, U-NII-8, IEEE 802.11ac (160MHz, MCS0, 90pc duty cycle), Channel 207 (6985.0 MHz)\_Aux

#### Device Under Test Properties

|                     |                      |      |          |
|---------------------|----------------------|------|----------|
| Model, Manufacturer | Dimensions [mm]      | IMEI | DUT Type |
| Framework,          | 298.0 x 235.0 x 13.0 |      | Laptop   |

#### Exposure Conditions

|                 |                              |         |                 |                                 |                   |
|-----------------|------------------------------|---------|-----------------|---------------------------------|-------------------|
| Phantom Section | Position, Test Distance [mm] | Band    | Group, UID      | Frequency [MHz], Channel Number | Conversion Factor |
| 5G Air          | Bottom, 2.00                 | U-NII-8 | WLAN, 10755-AAC | 6985.0, 207                     | 1.0               |

#### Hardware Setup

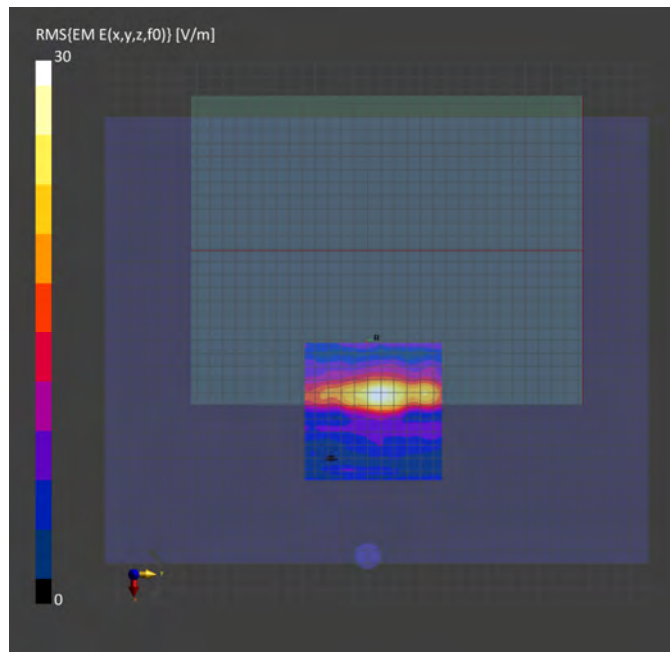
|               |        |                                       |                        |
|---------------|--------|---------------------------------------|------------------------|
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

#### Scans Setup

|                     |                 |
|---------------------|-----------------|
| Scan Type           | 5G Scan         |
| Grid Extents [mm]   | 100.0 x 100.0   |
| Grid Steps [lambda] | 0.0625 x 0.0625 |
| Sensor Surface [mm] | 2.0             |
| MAIA                | N/A             |

#### Measurement Results

|                              |                   |
|------------------------------|-------------------|
| Scan Type                    | 5G Scan           |
| Date                         | 2021-06-30, 23:56 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 1.24              |
| psPDtot+ [W/m <sup>2</sup> ] | 1.36              |
| psPDmod+ [W/m <sup>2</sup> ] | 1.43              |
| E <sub>max</sub> [V/m]       | 30.0              |
| Power Drift [dB]             | 0.15              |



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## 6. SAR System Performance Verification

Date: 2021/6/28

Report No. : EN/2021/40017

Dipole 2450 MHz, SN:727

Communication System: CW; Frequency: 2450 MHz; Duty cycle= 1:1

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.806$  S/m;  $\epsilon_r = 39.106$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Ambient temperature: 22.0°C; Liquid temperature: 22.2°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(8.16, 8.16, 8.16) @ 2450 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (51x61x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 21.2 W/kg

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.1 V/m; Power Drift = 0.05 dB

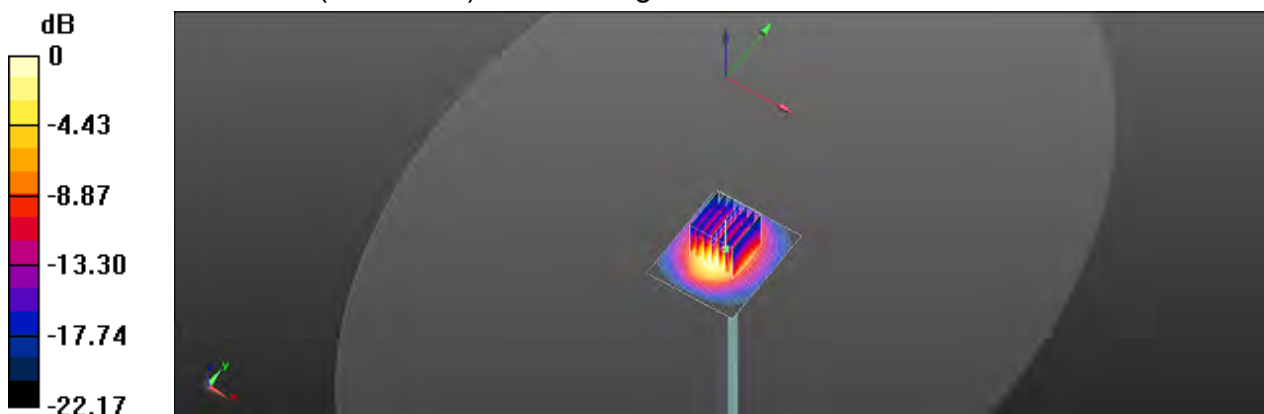
Peak SAR (extrapolated) = 26.6 W/kg

**SAR(1 g) = 13 W/kg; SAR(10 g) = 6.05 W/kg**

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 49.5%

Maximum value of SAR (measured) = 19.7 W/kg



0 dB = 19.7 W/kg = 12.94 dBW/kg

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Date: 2021/6/28

Report No. :EN/2021/40017

Dipole 5200 MHz, SN:1023

Communication System: CW; Frequency: 5200 MHz; Duty cycle= 1:1

Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 4.591 \text{ S/m}$ ;  $\epsilon_r = 35.837$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature:  $21.9^\circ\text{C}$ ; Liquid temperature:  $22.1^\circ\text{C}$ 

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5200 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (51x51x1): Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) =  $16.0 \text{ W/kg}$ 

Zoom Scan (7x7x12)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

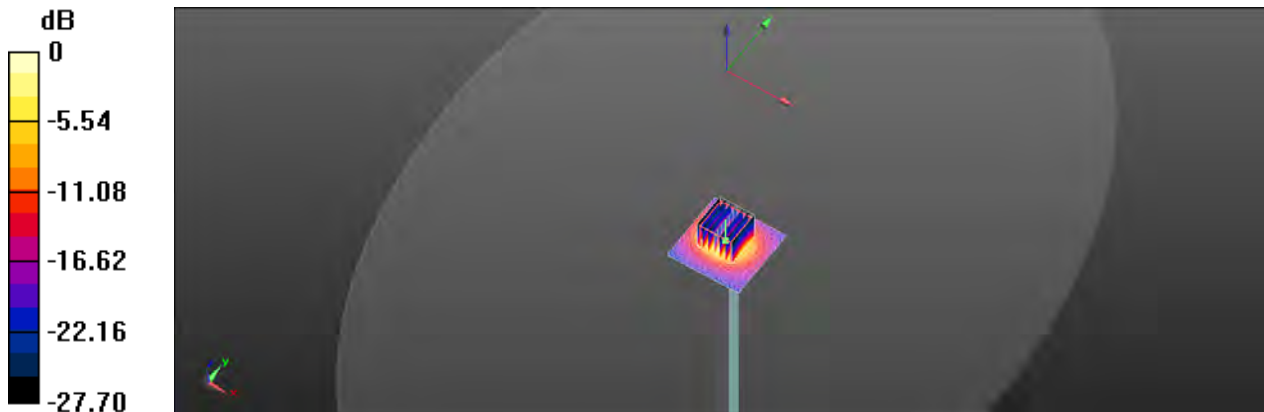
Reference Value =  $59.17 \text{ V/m}$ ; Power Drift =  $-0.00 \text{ dB}$ 

Peak SAR (extrapolated) =  $30.4 \text{ W/kg}$ 

SAR(1 g) =  $7.87 \text{ W/kg}$ ; SAR(10 g) =  $2.26 \text{ W/kg}$ 

Smallest distance from peaks to all points 3 dB below =  $7.4 \text{ mm}$ 

Ratio of SAR at M2 to SAR at M1 =  $56.3\%$ 

Maximum value of SAR (measured) =  $16.2 \text{ W/kg}$ 

 $0 \text{ dB} = 16.2 \text{ W/kg} = 12.10 \text{ dBW/kg}$ 

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Date: 2021/6/29

Report No. :EN/2021/40017

Dipole 5300 MHz, SN:1023

Communication System: CW; Frequency: 5300 MHz; Duty cycle= 1:1

Medium parameters used:  $f = 5300 \text{ MHz}$ ;  $\sigma = 4.727 \text{ S/m}$ ;  $\epsilon_r = 35.549$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature:  $21.7^\circ\text{C}$ ; Liquid temperature:  $21.9^\circ\text{C}$ 

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.68, 5.68, 5.68) @ 5300 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (51x51x1): Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) =  $17.0 \text{ W/kg}$ 

Zoom Scan (7x7x12)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

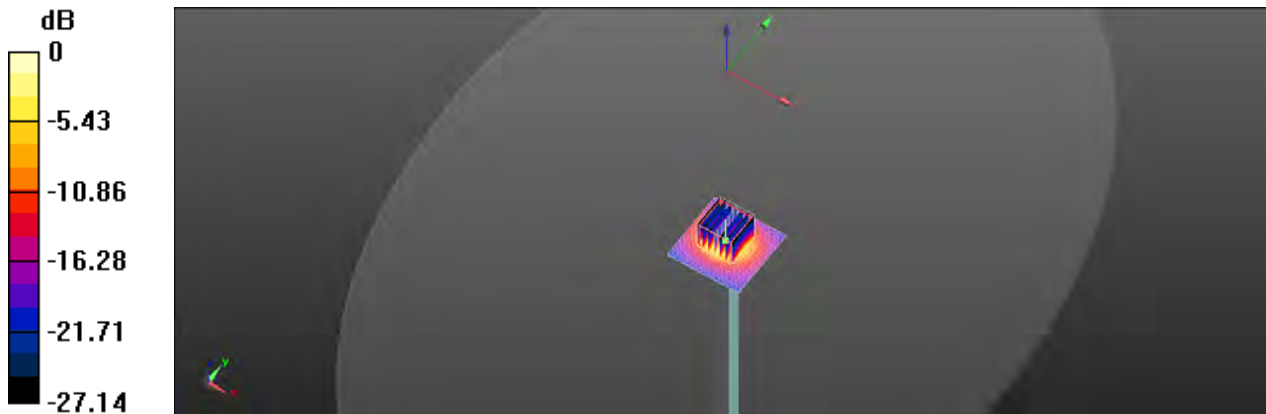
Reference Value =  $57.61 \text{ V/m}$ ; Power Drift =  $0.02 \text{ dB}$ 

Peak SAR (extrapolated) =  $33.1 \text{ W/kg}$ 

SAR(1 g) =  $8.1 \text{ W/kg}$ ; SAR(10 g) =  $2.31 \text{ W/kg}$ 

Smallest distance from peaks to all points 3 dB below =  $7.4 \text{ mm}$ 

Ratio of SAR at M2 to SAR at M1 =  $55.9\%$ 

Maximum value of SAR (measured) =  $17.3 \text{ W/kg}$ 

 $0 \text{ dB} = 17.3 \text{ W/kg} = 12.38 \text{ dBW/kg}$ 

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Date: 2021/6/29

Report No. :EN/2021/40017

Dipole 5600 MHz, SN:1023

Communication System: CW; Frequency: 5600 MHz; Duty cycle= 1:1

Medium parameters used:  $f = 5600 \text{ MHz}$ ;  $\sigma = 5.077 \text{ S/m}$ ;  $\epsilon_r = 34.872$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature:  $22.1^\circ\text{C}$ ; Liquid temperature:  $22.3^\circ\text{C}$ 

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.03, 5.03, 5.03) @ 5600 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

Area Scan (61x61x1): Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ 

Maximum value of SAR (interpolated) =  $17.8 \text{ W/kg}$ 

Zoom Scan (7x7x12)/Cube 0: Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ 

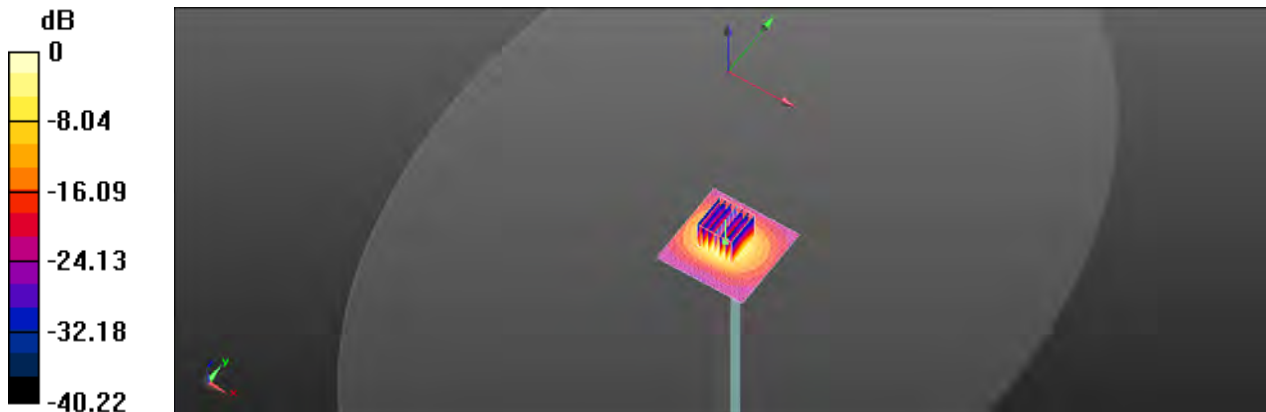
Reference Value =  $60.24 \text{ V/m}$ ; Power Drift =  $0.07 \text{ dB}$ 

Peak SAR (extrapolated) =  $36.4 \text{ W/kg}$ 

SAR(1 g) =  $8.55 \text{ W/kg}$ ; SAR(10 g) =  $2.45 \text{ W/kg}$ 

Smallest distance from peaks to all points 3 dB below =  $7.4 \text{ mm}$ 

Ratio of SAR at M2 to SAR at M1 =  $52.9\%$ 

Maximum value of SAR (measured) =  $17.9 \text{ W/kg}$ 

 $0 \text{ dB} = 17.9 \text{ W/kg} = 12.53 \text{ dBW/kg}$ 

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Date: 2021/6/29

**Report No. :EN/2021/40017****Dipole 5800 MHz, SN:1023**

Communication System: CW; Frequency: 5800 MHz; Duty cycle= 1:1

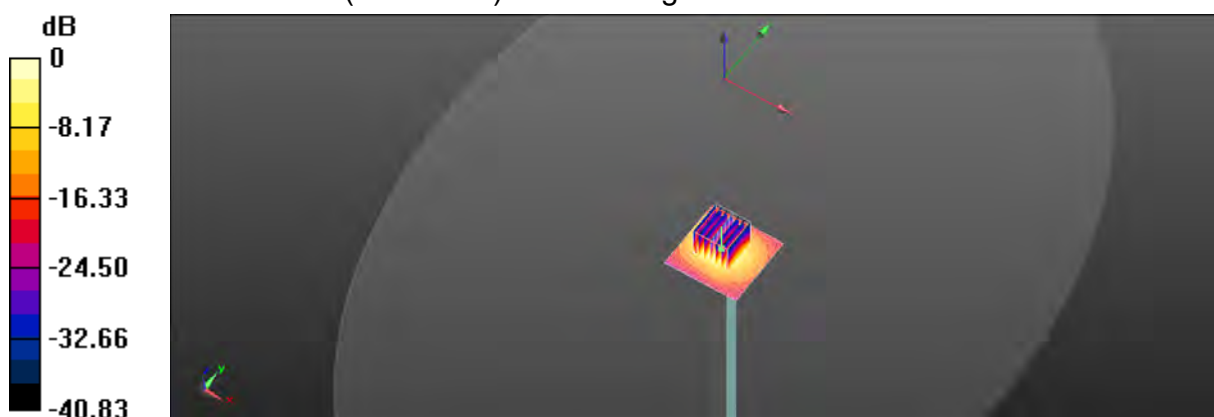
Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 5.316 \text{ S/m}$ ;  $\epsilon_r = 34.513$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Ambient temperature:  $21.8^\circ\text{C}$ ; Liquid temperature:  $22.0^\circ\text{C}$ 

DASY5 Configuration:

- Probe: EX3DV4 - SN7642; ConvF(5.2, 5.2, 5.2) @ 5800 MHz; Calibrated: 2021/3/19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 2021/4/23
- Phantom: ELI
- DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)

**Area Scan (51x51x1):** Interpolated grid:  $dx=10 \text{ mm}$ ,  $dy=10 \text{ mm}$ Maximum value of SAR (interpolated) =  $17.1 \text{ W/kg}$ **Zoom Scan (7x7x12)/Cube 0:** Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=2\text{mm}$ Reference Value =  $56.78 \text{ V/m}$ ; Power Drift =  $0.06 \text{ dB}$ Peak SAR (extrapolated) =  $36.1 \text{ W/kg}$ **SAR(1 g) =  $8.04 \text{ W/kg}$ ; SAR(10 g) =  $2.25 \text{ W/kg}$** Smallest distance from peaks to all points 3 dB below =  $7.5 \text{ mm}$ Ratio of SAR at M2 to SAR at M1 =  $50.9\%$ Maximum value of SAR (measured) =  $17.1 \text{ W/kg}$  $0 \text{ dB} = 17.1 \text{ W/kg} = 12.33 \text{ dBW/kg}$ 

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Report No. :EN/2021/40017

Measurement Report for Device, FRONT, Validation band, CW, Channel 6500 (6500.0 MHz)

## Device Under Test Properties

|                           |                    |      |          |
|---------------------------|--------------------|------|----------|
| Model, Manufacturer       | Dimensions [mm]    | IMEI | DUT Type |
| Dipole 6500 MHz, SN:1006, | 16.0 x 6.0 x 300.0 |      | Dipole   |

## Exposure Conditions

|                      |                              |                 |            |                                 |                   |                        |                  |
|----------------------|------------------------------|-----------------|------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band            | Group, UID | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | FRONT, 5.00                  | Validation band | CW, 0--    | 6500.0, 6500                    | 5.7               | 6.07                   | 33.9             |

## Hardware Setup

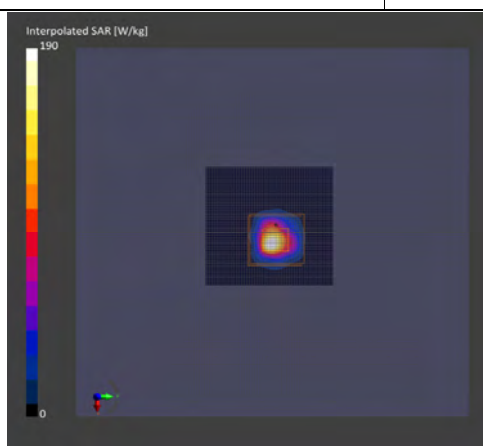
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000, 2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     | Area Scan   | Zoom Scan          |
|---------------------|-------------|--------------------|
| Grid Extents [mm]   | 51.0 x 51.0 | 28.0 x 28.0 x 24.0 |
| Grid Steps [mm]     | 8.5 x 8.5   | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0         | 1.4                |
| Graded Grid         | No          | Yes                |
| Grading Ratio       | n/a         | 1.4                |
| MAIA                | N/A         | N/A                |
| Surface Detection   | VMS + 6p    | VMS + 6p           |
| Scan Method         | Measured    | Measured           |

## Measurement Results

|                     | Area Scan         | Zoom Scan         |
|---------------------|-------------------|-------------------|
| Date                | 2021-06-27, 08:44 | 2021-06-27, 08:54 |
| psSAR1g [W/Kg]      | 24.1              | 29.9              |
| psSAR10g [W/Kg]     | 5.21              | 5.42              |
| Power Drift [dB]    | -0.07             | -0.15             |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 51.3              |
| Dist 3dB Peak [mm]  |                   | 4.6               |



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Report No. :EN/2021/40017

Measurement Report for Device, FRONT, Validation band, CW, Channel 7000 (7000.0 MHz)

## Device Under Test Properties

|                           |                    |      |          |
|---------------------------|--------------------|------|----------|
| Model, Manufacturer       | Dimensions [mm]    | IMEI | DUT Type |
| Dipole 7000 MHz, SN:1007, | 14.0 x 6.0 x 297.0 |      | Dipole   |

## Exposure Conditions

|                      |                              |                 |            |                                 |                   |                        |                  |
|----------------------|------------------------------|-----------------|------------|---------------------------------|-------------------|------------------------|------------------|
| Phantom Section, TSL | Position, Test Distance [mm] | Band            | Group, UID | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
| Flat, HSL            | FRONT, 5.00                  | Validation band | CW, 0--    | 7000.0, 7000                    | 5.85              | 6.74                   | 33.2             |

## Hardware Setup

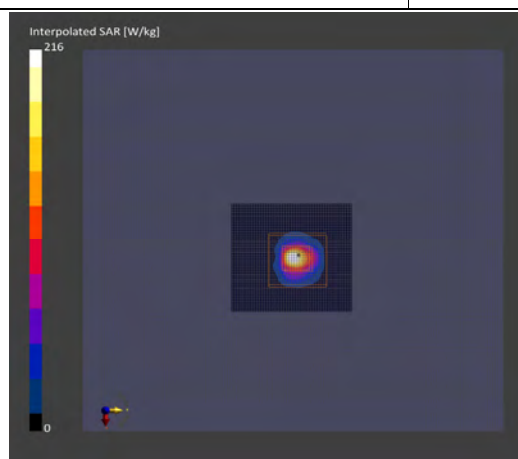
|                                    |                             |                             |                        |
|------------------------------------|-----------------------------|-----------------------------|------------------------|
| Phantom                            | TSL, Measured Date          | Probe, Calibration Date     | DAE, Calibration Date  |
| ELI V5.0 (20deg probe tilt) - 1141 | HBBL-600-10000 ,2021-Jun-27 | EX3DV4 - SN7466, 2021-01-29 | DAE4 Sn877, 2021-03-22 |

## Scans Setup

|                     |             |                    |
|---------------------|-------------|--------------------|
|                     | Area Scan   | Zoom Scan          |
| Grid Extents [mm]   | 45.0 x 45.0 | 28.0 x 28.0 x 24.0 |
| Grid Steps [mm]     | 7.5 x 7.5   | 3.4 x 3.4 x 1.4    |
| Sensor Surface [mm] | 3.0         | 1.4                |
| Graded Grid         | Yes         | Yes                |
| Grading Ratio       | 1.5         | 1.4                |
| MAIA                | N/A         | N/A                |
| Surface Detection   | VMS + 6p    | VMS + 6p           |
| Scan Method         | Measured    | Measured           |

## Measurement Results

|                     |                   |                   |
|---------------------|-------------------|-------------------|
|                     | Area Scan         | Zoom Scan         |
| Date                | 2021-06-27, 09:14 | 2021-06-27, 09:24 |
| psSAR1g [W/Kg]      | 26.2              | 28.2              |
| psSAR10g [W/Kg]     | 5.04              | 4.90              |
| Power Drift [dB]    | 0.04              | 0.03              |
| Power Scaling       | Disabled          | Disabled          |
| Scaling Factor [dB] |                   |                   |
| TSL Correction      | No correction     | No correction     |
| M2/M1 [%]           |                   | 47.4              |
| Dist 3dB Peak [mm]  |                   | 4.6               |



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Report No. : EN/2021/40017  
Measurement Report for 10G Source, Bottom, Validation band, CW, Channel 10000 (10000.0 MHz)  
Device Under Test Properties

| Model, Manufacturer | Dimensions [mm]       | IMEI | DUT Type |
|---------------------|-----------------------|------|----------|
| 10 GHz, SN:1021,    | 100.0 x 100.0 x 172.0 |      | Source   |

**Exposure Conditions**

| Phantom Section | Position, Test Distance [mm] | Band            | Group, UID | Frequency [MHz], Channel Number | Conversion Factor |
|-----------------|------------------------------|-----------------|------------|---------------------------------|-------------------|
| 5G Air          | Front, 10.00                 | Validation band | CW, 0--    | 10000.0, 10000                  | 1.0               |

**Hardware Setup**

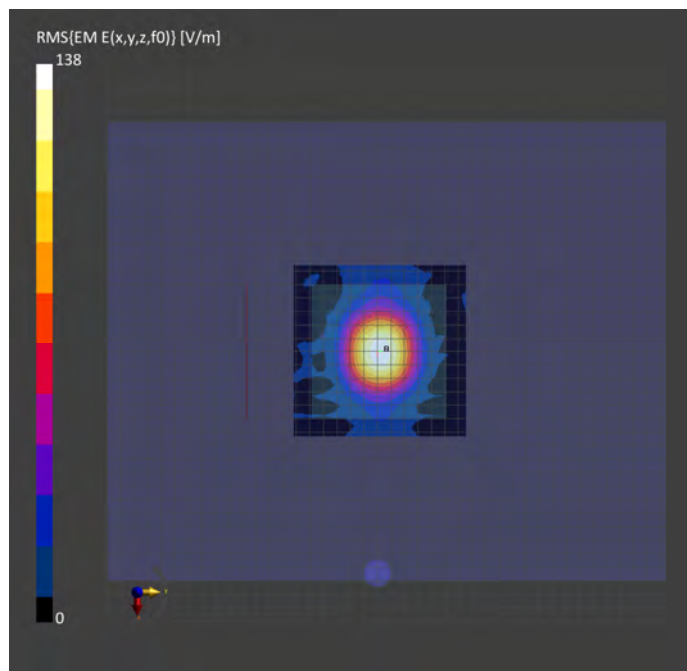
| Phantom       | Medium | Probe, Calibration Date               | DAE, Calibration Date  |
|---------------|--------|---------------------------------------|------------------------|
| mmWave - 1076 | Air -  | EUmmWV4 - SN9548_F1-55GHz, 2021-04-01 | DAE4 Sn877, 2021-03-22 |

**Scans Setup**

| Scan Type           | 5G Scan       |
|---------------------|---------------|
| Grid Extents [mm]   | 120.0 x 120.0 |
| Grid Steps [lambda] | 0.25 x 0.25   |
| Sensor Surface [mm] | 10.0          |
| MAIA                | N/A           |

**Measurement Results**

| Scan Type                    | 5G Scan           |
|------------------------------|-------------------|
| Date                         | 2021-06-28, 15:11 |
| Avg. Area [cm <sup>2</sup> ] | 4.00              |
| psPDn+ [W/m <sup>2</sup> ]   | 41.3              |
| psPDtot+ [W/m <sup>2</sup> ] | 41.5              |
| psPDmod+ [W/m <sup>2</sup> ] | 41.6              |
| E <sub>max</sub> [V/m]       | 136               |
| Power Drift [dB]             | 0.06              |



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## 7. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test (3-6G)

| A                                             | c                       | D               | e          |           | f       | g        | $h=c * f / e$           | $i=c * g / e$           | k              |
|-----------------------------------------------|-------------------------|-----------------|------------|-----------|---------|----------|-------------------------|-------------------------|----------------|
| Source of Uncertainty                         | Tolerance/<br>Uncertain | Probabili<br>ty | Div        | Div Value | ci (1g) | ci (10g) | Standard<br>uncertainty | Standard<br>uncertainty | vi, or<br>Veff |
| <b>Measurement system</b>                     |                         |                 |            |           |         |          |                         |                         |                |
| Probe calibration                             | 6.55%                   | N               | 1          | 1         | 1       | 1        | 6.55%                   | 6.55%                   | $\infty$       |
| <b>Isotropy , Axial</b>                       | 3.50%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.02%                   | 2.02%                   | $\infty$       |
| <b>Isotropy, Hemispherical</b>                | 9.60%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 5.54%                   | 5.54%                   | $\infty$       |
| Modulation Response                           | 2.40%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.40%                   | 1.40%                   | $\infty$       |
| Boundary Effect                               | 1.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | $\infty$       |
| Linearity                                     | 4.70%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.71%                   | 2.71%                   | $\infty$       |
| Detection Limits                              | 1.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | $\infty$       |
| Readout Electronics                           | 0.30%                   | N               | 1          | 1         | 1       | 1        | 0.30%                   | 0.30%                   | $\infty$       |
| Response time                                 | 0.80%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.46%                   | 0.46%                   | $\infty$       |
| Integration Time                              | 2.60%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.50%                   | 1.50%                   | $\infty$       |
| <b>Measurement drift (class A evaluation)</b> | 1.75%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.01%                   | 1.01%                   | $\infty$       |
| RF ambient condition - noise                  | 3.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.73%                   | 1.73%                   | $\infty$       |
| RF ambient conditions - reflections           | 3.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.73%                   | 1.73%                   | $\infty$       |
| Probe positioner Mechanical restrictions      | 0.40%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.23%                   | 0.23%                   | $\infty$       |
| Probe Positioning with respect to phantom     | 2.90%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.67%                   | 1.67%                   | $\infty$       |
| Post-processing                               | 1.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | $\infty$       |
| Max SAR Eval                                  | 1.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | $\infty$       |
| <b>Test Sample related</b>                    |                         |                 |            |           |         |          |                         |                         |                |
| Test sample positioning                       | 2.90%                   | N               | 1          | 1         | 1       | 1        | 2.90%                   | 2.90%                   | M-1            |
| Device Holder Uncertainty                     | 3.60%                   | N               | 1          | 1         | 1       | 1        | 3.60%                   | 3.60%                   | M-1            |
| Drift of output power                         | 5.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.89%                   | 2.89%                   | $\infty$       |
| <b>Phantom and Setup</b>                      |                         |                 |            |           |         |          |                         |                         |                |
| Phantom Uncertainty                           | 4.00%                   | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.31%                   | 2.31%                   | $\infty$       |
| Liquid permittivity (mea.)                    | 2.23%                   | N               | 1          | 1         | 0.64    | 0.43     | 1.43%                   | 0.96%                   | M              |
| Liquid Conductivity (mea.)                    | 1.37%                   | N               | 1          | 1         | 0.6     | 0.49     | 0.82%                   | 0.67%                   | M              |
| Combined standard uncertainty                 |                         | RSS             |            |           |         |          | 11.83%                  | 11.77%                  |                |
| Expant uncertainty (95% confidence)           |                         |                 |            |           |         |          | 23.66%                  | 23.53%                  |                |

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Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

| A                                             | c                         | D               | e          |           | f       | g        | h=c * f / e             | i=c * g / e             | k              |
|-----------------------------------------------|---------------------------|-----------------|------------|-----------|---------|----------|-------------------------|-------------------------|----------------|
| Source of Uncertainty                         | Tolerance/<br>Uncertainty | Probabili<br>ty | Div        | Div Value | ci (1g) | ci (10g) | Standard<br>uncertainty | Standard<br>uncertainty | vi, or<br>Veff |
| <b>Measurement system</b>                     |                           |                 |            |           |         |          |                         |                         |                |
| Probe calibration                             | 6.00%                     | N               | 1          | 1         | 1       | 1        | 6.00%                   | 6.00%                   | ∞              |
| <b>Isotropy , Axial</b>                       | 3.50%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.02%                   | 2.02%                   | ∞              |
| <b>Isotropy, Hemispherical</b>                | 9.60%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 5.54%                   | 5.54%                   | ∞              |
| Modulation Response                           | 2.40%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.40%                   | 1.40%                   | ∞              |
| Boundary Effect                               | 1.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | ∞              |
| Linearity                                     | 4.70%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.71%                   | 2.71%                   | ∞              |
| Detection Limits                              | 1.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | ∞              |
| Readout Electronics                           | 0.30%                     | N               | 1          | 1         | 1       | 1        | 0.30%                   | 0.30%                   | ∞              |
| Response time                                 | 0.80%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.46%                   | 0.46%                   | ∞              |
| Integration Time                              | 2.60%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.50%                   | 1.50%                   | ∞              |
| <b>Measurement drift (class A evaluation)</b> | 1.75%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.01%                   | 1.01%                   | ∞              |
| RF ambient condition - noise                  | 3.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.73%                   | 1.73%                   | ∞              |
| RF ambient conditions - reflections           | 3.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.73%                   | 1.73%                   | ∞              |
| Probe positioner Mechanical restrictions      | 0.40%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.23%                   | 0.23%                   | ∞              |
| Probe Positioning with respect to phantom     | 2.90%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 1.67%                   | 1.67%                   | ∞              |
| Post-processing                               | 1.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | ∞              |
| Max SAR Eval                                  | 1.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 0.58%                   | 0.58%                   | ∞              |
| <b>Test Sample related</b>                    |                           |                 |            |           |         |          |                         |                         |                |
| Test sample positioning                       | 2.90%                     | N               | 1          | 1         | 1       | 1        | 2.90%                   | 2.90%                   | M-1            |
| Device Holder Uncertainty                     | 3.60%                     | N               | 1          | 1         | 1       | 1        | 3.60%                   | 3.60%                   | M-1            |
| Drift of output power                         | 5.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.89%                   | 2.89%                   | ∞              |
| <b>Phantom and Setup</b>                      |                           |                 |            |           |         |          |                         |                         |                |
| Phantom Uncertainty                           | 4.00%                     | R               | $\sqrt{3}$ | 1.732     | 1       | 1        | 2.31%                   | 2.31%                   | ∞              |
| Liquid permittivity (mea.)                    | 0.32%                     | N               | 1          | 1         | 0.64    | 0.43     | 0.20%                   | 0.14%                   | M              |
| Liquid Conductivity (mea.)                    | 0.44%                     | N               | 1          | 1         | 0.6     | 0.49     | 0.26%                   | 0.22%                   | M              |
| Combined standard uncertainty                 |                           | RSS             |            |           |         |          | 11.42%                  | 11.41%                  |                |
| Expant uncertainty (95% confidence)           |                           |                 |            |           |         |          | 22.85%                  | 22.82%                  |                |

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### DASY6 Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 6GHz - 10GHz range)

| a                                                        | b                      | c                        | d    |            | e       | e        | f=b * e / d                | f=b * e / d                 |
|----------------------------------------------------------|------------------------|--------------------------|------|------------|---------|----------|----------------------------|-----------------------------|
| Source of Uncertainty                                    | Uncertainty Value (±%) | Probability Distribution | Div. | Div. Value | (ci) 1g | (ci) 10g | Std. uncertainty (1g) (±%) | Std. uncertainty (10g) (±%) |
| <b>Measurement system errors</b>                         |                        |                          |      |            |         |          |                            |                             |
| Probe calibration                                        | 18.6                   | N                        | 2    | 2          | 1       | 1        | 9.3                        | 9.3                         |
| Probe Calibration Drift                                  | 1.7                    | R                        | √3   | 1.732      | 1       | 1        | 1.0                        | 1.0                         |
| Probe Linearity                                          | 4.7                    | R                        | √3   | 1.732      | 1       | 1        | 2.7                        | 2.7                         |
| Broadband Signal                                         | 2.8                    | R                        | √3   | 1.732      | 1       | 1        | 1.6                        | 1.6                         |
| Probe Isotropy                                           | 7.6                    | R                        | √3   | 1.732      | 1       | 1        | 4.4                        | 4.4                         |
| Data Acquisition                                         | 0.3                    | N                        | 1    | 1          | 1       | 1        | 0.3                        | 0.3                         |
| RF Ambient                                               | 1.8                    | N                        | 1    | 1          | 1       | 1        | 1.8                        | 1.8                         |
| Probe positioning                                        | 0.2                    | N                        | 1    | 1          | 0.67    | 0.67     | 0.1                        | 0.1                         |
| Data Processing                                          | 3.5                    | N                        | 1    | 1          | 1       | 1        | 3.5                        | 3.5                         |
| <b>Phantom and device errors</b>                         |                        |                          |      |            |         |          |                            |                             |
| Conductivity (meas.)DAK                                  | 2.5                    | N                        | 1    | 1          | 0.78    | 0.71     | 2.0                        | 1.8                         |
| Conductivity (temp.)BB                                   | 2.4                    | R                        | √3   | 1.732      | 0.78    | 0.71     | 1.1                        | 1.0                         |
| Phantom Permittivity                                     | 14.0                   | R                        | √3   | 1.732      | 0.5     | 0.5      | 4.0                        | 4.0                         |
| Distance DUT - TSL                                       | 2.0                    | N                        | 1    | 1          | 2       | 2        | 4.0                        | 4.0                         |
| Device Positioning (±0.5mm)                              | 1.0                    | N                        | 1    | 1          | 1       | 1        | 1.0                        | 1.0                         |
| Device Holder                                            | 3.6                    | N                        | 1    | 1          | 1       | 1        | 3.6                        | 3.6                         |
| DUT Modulationm                                          | 2.4                    | R                        | √3   | 1.732      | 1       | 1        | 1.4                        | 1.4                         |
| Time-average SAR                                         | 0.0                    | R                        | √3   | 1.732      | 1       | 1        | 0.0                        | 0.0                         |
| DUT drift                                                | 2.5                    | N                        | 1    | 1          | 1       | 1        | 2.5                        | 2.5                         |
| Val Antenna Unc.                                         | 0.0                    | N                        | 1    | 1          | 1       | 1        | 0.0                        | 0.0                         |
| Unc. Input Power                                         | 0.0                    | N                        | 1    | 1          | 1       | 1        | 0.0                        | 0.0                         |
| <b>Correction to the SAR results</b>                     |                        |                          |      |            |         |          |                            |                             |
| Deviation to Target                                      | 1.90                   | N                        | 1    | 1          | 1       | 0.84     | 1.9                        | 1.6                         |
| SAR scaling                                              | 0.409                  | R                        | √3   | 1.732      | 1       | 1        | 0.2                        | 0.2                         |
| Combined Std. uncertainty                                |                        |                          |      |            |         |          | 14.0                       | 13.9                        |
| Expanded Std. uncertainty (95% confidence interval), K=2 |                        |                          |      |            |         |          | 28.0                       | 27.8                        |

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## cDASY6 Module mmWave Uncertainty Budget for PD Evaluation Distances to the Antennas $\geq \lambda / 5$ In Compliance with IEC/IEEE 63195

| a                                                                       | b                        | c                        | d          |            | e  | f=b * e / d             | g         |
|-------------------------------------------------------------------------|--------------------------|--------------------------|------------|------------|----|-------------------------|-----------|
| Source of Uncertainty                                                   | Uncertainty Value (+-dB) | Probability Distribution | Div.       | Div. Value | ci | Std. uncertainty (+-dB) | (vi) Veff |
| <b>Uncertainty terms dependent on the measurement system</b>            |                          |                          |            |            |    |                         |           |
| Probe calibration                                                       | 0.49                     | N                        | 1          | 1          | 1  | 0.49                    | $\infty$  |
| Probe correction                                                        | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Frequency response ( $BW \leq 1\text{GHz}$ )                            | 0.20                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.12                    | $\infty$  |
| Sensor cross coupling                                                   | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Isotropy                                                                | 0.50                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.29                    | $\infty$  |
| Linearity                                                               | 0.20                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.12                    | $\infty$  |
| Probe scattering                                                        | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Probe positioning offset                                                | 0.30                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.17                    | $\infty$  |
| Probe positioning repeatability                                         | 0.04                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.02                    | $\infty$  |
| Sensor mechanical offset                                                | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Probe spatial resolution                                                | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Field impedance dependance                                              | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Amplitude and phase drift                                               | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Amplitude and phase noise                                               | 0.04                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.02                    | $\infty$  |
| Measurement area truncation                                             | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Data acquisition                                                        | 0.03                     | N                        | 1          | 1          | 1  | 0.03                    | $\infty$  |
| Sampling                                                                | 0.00                     | R                        | $\sqrt{3}$ | 1          | 1  | 0.00                    | $\infty$  |
| Field reconstruction                                                    | 2.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 1.15                    | $\infty$  |
| Forward transformation                                                  | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Power density scaling                                                   | -                        | R                        | $\sqrt{3}$ | 1.732      | 1  | -                       | $\infty$  |
| Spatial averaging                                                       | 0.10                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.06                    | $\infty$  |
| System detection limit                                                  | 0.04                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.02                    | $\infty$  |
| <b>Uncertainty terms dependent on the DUT and environmental factors</b> |                          |                          |            |            |    |                         |           |
| Probe coupling with DUT                                                 | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Modulation response                                                     | 0.40                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.23                    | $\infty$  |
| Integration time                                                        | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Response time                                                           | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Device holder influence                                                 | 0.10                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.06                    | $\infty$  |
| DUT alignment                                                           | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| RF ambient conditions                                                   | 0.04                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.02                    | $\infty$  |
| Ambient reflections                                                     | 0.04                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.02                    | $\infty$  |
| Immunity / secondary reception                                          | 0.00                     | R                        | $\sqrt{3}$ | 1.732      | 1  | 0.00                    | $\infty$  |
| Drift of the DUT                                                        | -                        | R                        | $\sqrt{3}$ | 1.732      | 1  | -                       | $\infty$  |
| Combined Std. uncertainty                                               |                          |                          |            |            |    | 1.33                    |           |
| Expanded Std. uncertainty (95% confidence interval), K=2                |                          |                          |            |            |    | 2.67                    |           |

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## Appendixes

**Refer to separated files for the following appendixes.**

**EN202140017 SAR\_Appendix A Photographs**

**EN202140017 SAR\_Appendix B DAE & Probe Cal. Certificate**

**EN202140017 SAR\_Appendix C Phantom Description & Dipole Cal. Certificate**

**- End of report -**

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