FCC HAC (RF Emission) Test Report

Report No.	:	**PSU-NQN2403180115SA04**
Applicant	:	**HMD Global Oy**
Address	:	**Bertel Jungin aukio 9,02600 Espoo, Finland**
Manufacturer	:	**HMD Global Oy**
Address	:	**Bertel Jungin aukio 9,02600 Espoo, Finland**
Product	:	**Smart phone**
FCC ID	:	**2AJOTTA-1600**
Brand	:	**HMD**
Model No.	:	**TA-1600/TA-1688**
Standards	:	**FCC 47 CFR Part 20.19 / ANSI C63.19-2019** **KDB 285076 D01 v06r04 / KDB 285076 D02 v04**
Date of Testing	:	**May. 20, 2024 ~ May. 20, 2024**
FCC Designation No.	:	**CN1325** **FCC Site Registration No. : 434559**
Issued By	:	**Huarui 7layers High Technology (Suzhou) Co., Ltd.**
Address	:	**Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province China**

CERTIFICATION: The above equipment have been tested by **Huarui 7layers High Technology (Suzhou) Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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Release Control Record

Report No.	Reason for Change	Date Issued
PSU-NQN2403180115SA04	Initial release	Jun. 03, 2024

1. Summary of Maximum RF Value

Mode	Band	Maximum Audio Interference Level RFAIL (dBV/m)	Result
GSM CMRS Voice	GSM850	24.13	PASS
	GSM1900	32.36	PASS
UMTS CMRS Voice	Band II	N/A	PASS
	Band IV	N/A	PASS
	Band V	N/A	PASS
VoLTE	Band 7	N/A	PASS
	Band 12/17	N/A	PASS
	Band 13	N/A	PASS
	Band 25/2	N/A	PASS
	Band 26/5	N/A	PASS
	Band 38	N/A	PASS
	Band 41	14.99	PASS
	Band 66/4	N/A	PASS
	Band 71	N/A	PASS
VoNR	NR n5	N/A	PASS
	NR n7	N/A	PASS
	NR n25/2	N/A	PASS
	NR n38	N/A	PASS
	NR n41	17.29	PASS
	NR n48	N/A	PASS
	NR n66	N/A	PASS
	NR n71	N/A	PASS
	NR n77	25.79	PASS
	NR n78	N/A	PASS
VoWiFi	WLAN 2.4G	N/A	PASS
	WLAN 5.2G	N/A	PASS
	WLAN 5.3G	N/A	PASS
	WLAN 5.5G	N/A	PASS
	WLAN 5.8G	N/A	PASS
	WLAN 6E	N/A	PASS

Note:

1. The HAC RF emission limit is specified in FCC 47 CFR part 20.19 and ANSI C63.19.
2. The device RF emission rating is determined by the minimum rating.

2. Description of Equipment Under Test

EUT Type	Smart phone
FCC ID	2AJOTTA-1600
Brand Name	HMD
Model Name	TA-1600/TA-1688
IMEI Code	Sample 1: 355876370026597 / 355876370026605 Sample 2: 355876370062113 / 355876370062121
HW Version	V2
SW Version	00WW_0_340
Tx Frequency Bands (Unit: MHz)	GSM850 : 824 ~ 849 GSM1900 : 1850 ~ 1910 WCDMA Band II : 1850 ~ 1910 WCDMA Band IV : 1710 ~ 1755 WCDMA Band V : 824 ~ 849 LTE Band 2 : 1850 ~ 19010 LTE Band 4 : 1710 ~ 1755 LTE Band 5 : 824 ~ 849 LTE Band 7 : 2500 ~ 2570 LTE Band 12 : 699 ~ 716 LTE Band 13 : 777 ~ 787 LTE Band 17 : 704 ~ 716 LTE Band 25 : 1850 ~ 1915 LTE Band 26 : 814 ~ 849 LTE Band 38 : 2570 ~ 2620 LTE Band 41 : 2496 ~ 2690 LTE Band 66 : 1710 ~ 1780 LTE Band 71 : 663 ~ 698 NR Band n2 : 1850 ~ 1910 NR Band n5 : 824 ~ 849 NR Band n7 : 2500 ~ 2570 NR Band n25 : 1850 ~ 1915 NR Band n38 : 2570 ~ 2620 NR Band n41 : 2496 ~ 2690 NR Band n48 : 3550 ~ 3700 NR Band n66 : 1710 ~ 1780 NR Band n71 : 663 ~ 698 NR Band n77 : 3450 ~ 3550, 3700 ~ 3980 NR Band n78 : 3450 ~ 3550 WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5700, 5745 ~ 5825 WLAN 6E: 5945 ~ 6425, 6425 ~ 6525, 6525 ~ 6875, 6875 ~ 7125 Bluetooth : 2402 ~ 2480
Uplink Modulations	GSM & GPRS & EDGE : GMSK, 8PSK WCDMA : QPSK LTE : QPSK, 16QAM, 64QAM NR : Pi/2 BPSK (DFT-s-OFDM), QPSK (DFT-s-OFDM, CP-OFDM), 16QAM (DFT-s-OFDM, CP-OFDM), 64QAM (DFT-s-OFDM, CP-OFDM), 256QAM DFT-s-OFDM, CP-OFDM) 802.11b : DSSS 802.11a/g/n/ac : OFDM 802.11ax : OFDMA Bluetooth : GFSK, π/4-DQPSK, 8-DPSK, LE
Subcarrier Spacing	15 kHz（FDD）/ 30 kHz（TDD）
Uplink Transmission Duty Cycle	For 5G NR bands test, using FTM (Factory Test Mode) with default 100% duty cycle transmission to perform evaluation.
Antenna Type	IFA Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. According to the document <Difference of change> provided by the manufacturer, these changes do not affect the RF parameters, so sample 1 is fully tested, and sample 2 verifies the worst case

Air Interface and Operational Mode:

Air Interface	Bands	Transport Type	ANSI C63.19	Simultaneous But Not Tested	Name of Voice Service	Power Reduction
GSM	850	VO	Yes	WLAN, BT	CMRS Voice	No
	1900					No
	EGPRS	VD	Yes	WLAN, BT	Google Meet(1)	No
UMTS	Band 2	VO	Yes	WLAN, BT	CMRS Voice	No
	Band 4					No
	Band 5					No
	HSPA	VD	Yes	WLAN, BT	Google Meet(1)	No
LTE (FDD)	Band 2	VD	Yes	NR, WLAN, BT	VoLTE / Google Meet(1)	No
	Band 4					No
	Band 5					No
	Band 7					No
	Band 12					No
	Band 13					No
	Band 17					No
	Band 25					No
	Band 26					No
	Band 66					No
	Band 71					No
LTE (TDD)	Band 38					No
	Band 41					No
NR (FDD)	NR n2	VD	Yes	LTE, WLAN, BT	VoNR / Google Meet(1)	No
	NR n5					No
	NR n7					No
	NR n25					No
	NR n66					No
	NR n71					No
NR (TDD)	NR n38					No
	NR n41					No
	NR n48					No
	NR n77					No
	NR n78					No
WLAN	2.4G	VD	Yes	GSM, WCDMA, LTE, NR	VoWiFi / Google Meet(1)	No
	5.2G					No
	5.3G					No
	5.5G					No
	5.8G					No
WLAN	6E	VD	No	GSM, WCDMA, LTE, NR	VoWiFi / Google Meet(1)	No
Bluetooth	2.4G	DT	No	GSM, WCDMA, LTE, NR	N/A	No

Transport Type:
VO = Legacy Cellular Voice Service
DT = Digital Transport Only (No Voice)
VD = IP Voice Service over Digital Transport

Note:
1. The air interface max power plus MIF is complies with ANSI C63.19-2019 Table 4.1 RFAIPL.
2. The device have similar frequency in some LTE/5G NR FR1 bands: LTE B2/25, 5/26, 4/66, 12/17, 5G NR n2/25 since the supported frequency spans for the smaller LTE/5G NR FR1 bands are completely cover by the larger LTE/5G NR FR1 bands, therefore, only larger LTE/5G NR FR1 bands were required to be tested for hearing-aid compliance.

3. HAC RF Emission Measurement System

3.1 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

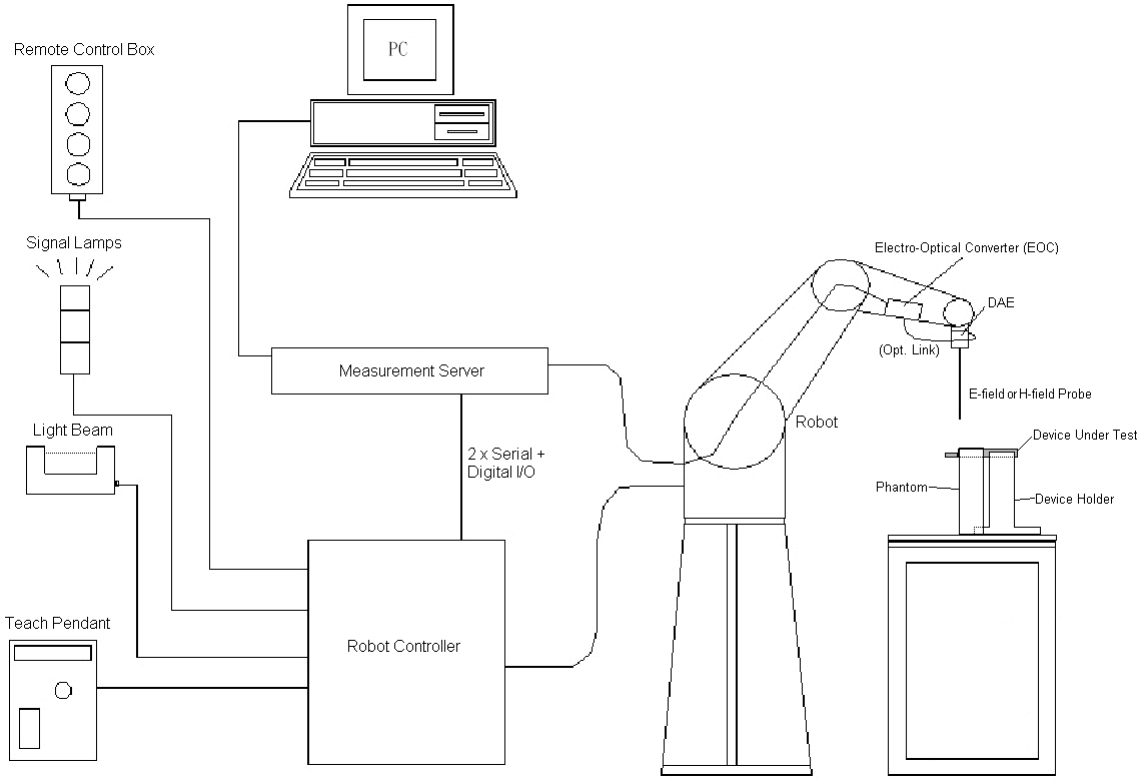


Fig-3.1 DASY System Setup

3.1.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY6: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

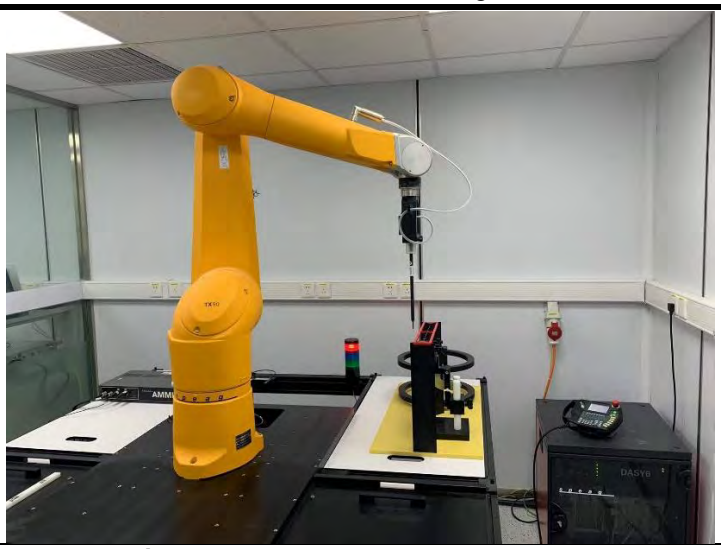


Fig-3.2 DASY6 Measurement System

3.1.2 Probes

Model	ER3DV6
Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges
Frequency	40 MHz to 3 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to 1000 V/m Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm

Model	EF3DV3
Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges
Frequency	40 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to 1000 V/m Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.5 mm

3.1.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5µV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm

3.1.4 Phantoms

Model	Test Arch
Construction	Enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot.
Dimensions	Length : 370 mm Width : 370 mm Height : 370 mm

3.1.5 Device Holder

Model	Mounting Device
Construction	The Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to ANSI C63.19.
Material	POM

3.1.6 RF Emission Calibration Dipoles

Model	CD-Serial
Construction	Free space antenna Hearing Aid susceptibility measurements according to ANSI C63.19. Validation of Hearing Aid RF setup for wireless device emission measurements according to ANSI C63.19
Frequency	CD700V3 : 698 ~ 806 MHz CD835V3 : 800 ~ 960 MHz CD1880V3 : 1710 ~ 2000 MHz CD2450V3 : 2250 ~ 2650 MHz CD2600V3 : 2450 ~ 2750 MHz CD3500V3 : 3300 ~ 3950 MHz CD5500V3 : 5000 ~ 5900 MHz
Return Loss	CD700V3 : > 15 dB (750 MHz > 20 dB) CD835V3 : > 15 dB (835 MHz > 25 dB) CD1880V3 : > 18 dB (1880 MHz > 20 dB) CD2450V3 : > 18 dB (2450 MHz > 25 dB) CD2600V3 : > 18 dB (2600 MHz > 20 dB) CD3500V3 : > 16 dB (3500 MHz > 20 dB) CD5500V3 : > 18 dB (5500 MHz > 20 dB)
Power Capability	> 40 W continuous

3.2 DASY System Verification

The system check verifies that the system operates within its specifications. It is performed before every E-field measurement. The system check uses normal measurements in the center section of the arch phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

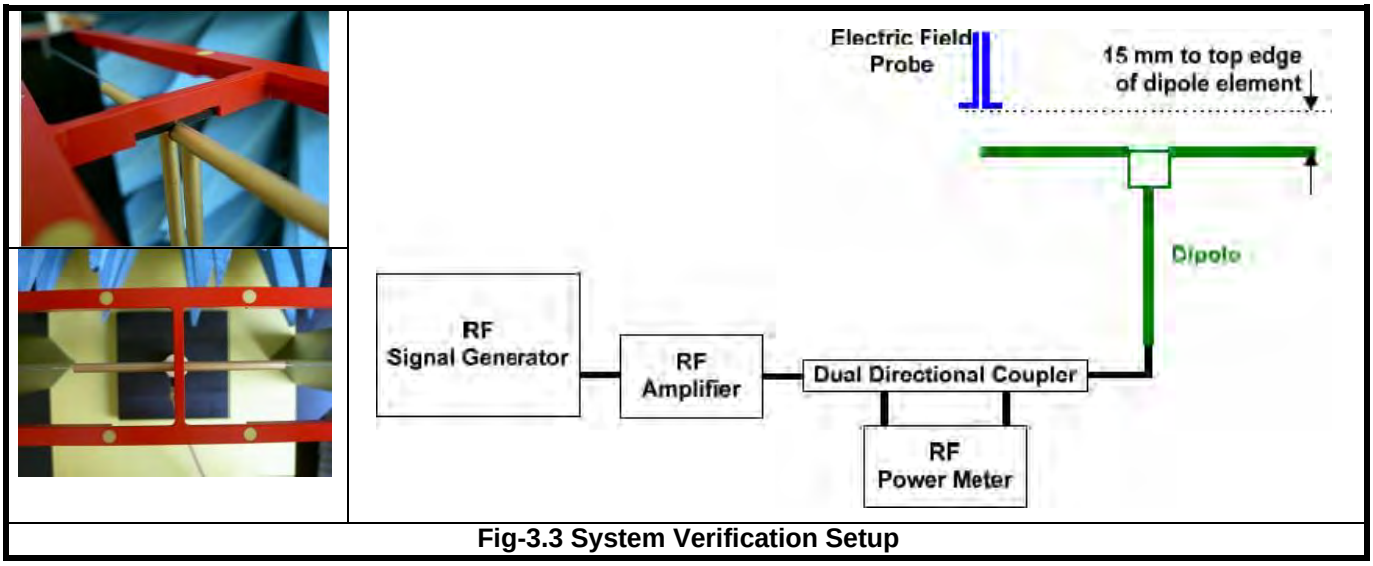


Fig-3.3 System Verification Setup

The validation dipole is placed beneath the center of arch phantom. The power meter measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power, 100 mW (20 dBm) at the dipole connector and the RF power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at RF power meter.

After system check testing, the E-field result will be compared with the reference value derived from validation dipole certificate report. The deviation of system check should be within 25 %.

The result of system verification is shown in section 4.3 of this report.

3.3 EUT Measurements Reference and Plane

The EUT is mounted in the device holder. The acoustic output of the EUT will coincide with the center point of the area formed by the dielectric wire and the middle bar of the arch's top frame. Then EUT will be moved vertically upwards until it touches the frame.

Fig-3.4 and Fig-3.5 illustrate the references and reference plane that is used in the RF emissions measurement.

(a) The measurement area is 50.0 mm by 50.0 mm.

(b) The grid is centered on the audio frequency output transducer of the EUT.

(c) The measurement area is in a reference plane, which is defined as the planar area tangent to the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the WD handset, which, in normal handset use, rest against the ear.

(d) The measurement plane is parallel to and 15 mm in front of the reference plane.

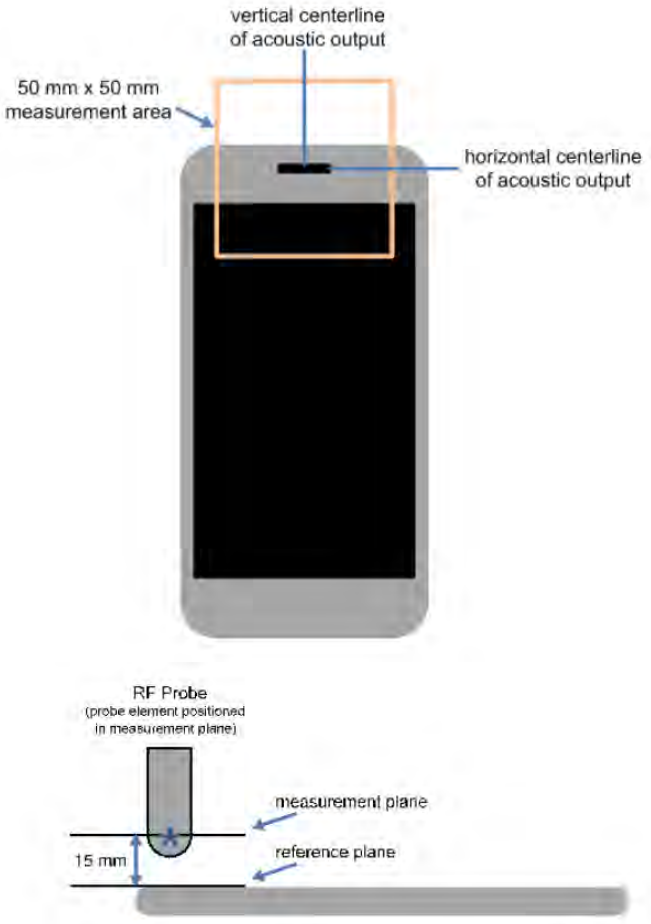


Fig-3.4 The references and reference plane that shall be used in the WD emissions measurement

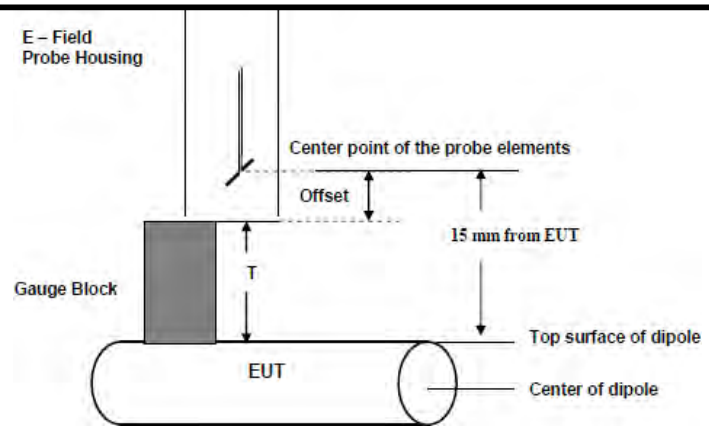


Fig-3.5 Gauge Block for Setting Measurement Distance to Probe

3.4 HAC RF Emission Measurement Procedure

The RF emissions test procedure for wireless communications device is as below.

1. Confirm proper operation of the field probe, probe measurement system, spectral and temporal weighting filters, and the positioning system.
2. Position the WD in its intended test position.
3. Set the WD to transmit a fixed and repeatable combination of signal power and modulation characteristic that is representative of the worst case (highest interference potential) encountered in normal use. Transiently occurring start-up, changeover, or termination conditions, or other operation likely to occur less than 1% of the time during normal operation, may be excluded from consideration.
4. The center sub-grid shall be centered on the T-Coil mode perpendicular measurement point or the acoustic output, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm grid, which is contained in the measurement plane, illustrated in Fig-3.4. If the field alignment method is used, align the probe for maximum field reception.
5. Record the reading at the output of the measurement system.
6. Scan the entire 50 mm by 50 mm region in equally spaced increments and record the reading at each measurement point. The distance between measurement points shall be sufficient to assure the identification of the maximum reading.
7. Calculate the average of the measurements taken in Step 6.
8. The RF audio interference level in dB(V/m) is obtained by adding the Modulation Interference Factor (in decibels) to the average steady state rms field strength reading over the measurement area, in dB(V/m), from Step 7). Use this result to determine the WD's compliance per ANSI C63.19-2019 Section 4.7

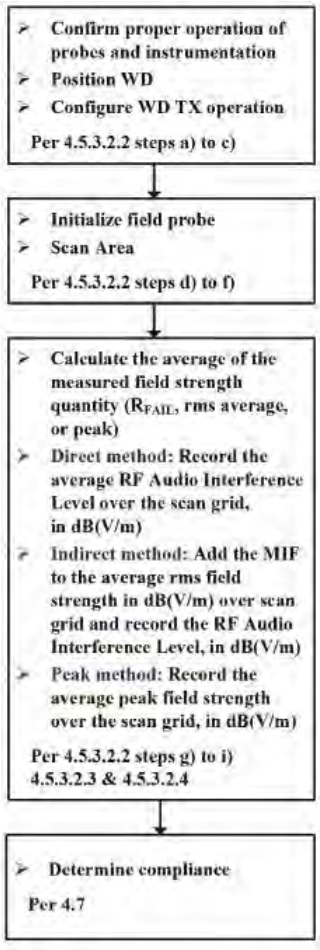


Figure of WD near-field emission scan flowchart according to ANSI C63.19:2019

3.5 Modulation Interference Factor

The HAC Standard ANSI C63.19-2019 defines a new scaling using the Modulation Interference Factor (MIF) which replaces the need for the Articulation Weighting Factor (AWF) during the evaluation and is applicable to any modulation scheme.

The Modulation Interference Factor (MIF, in dB) is added to the measured average E-field (in dBV/m) and converts it to the RF audio interference potential (in dBV/m). This level considers the audible amplitude modulation components in the RF E-field. CW fields without amplitude modulation are assumed to not interfere with the hearing aid electronics. Modulations without time slots and low fluctuations at low frequencies have low MIF values, TDMA modulations with narrow transmission slots and repetition rates of few 100 Hz have high MIF values and give similar classification as ANSI C63.19-2007.

ER3D E-field probe have a bandwidth <10 kHz and can therefore not evaluate the RF envelope in the full audio band. DASY is therefore using the “indirect" measurement method according to ANSI C63.19-2019 which is the primary method. This near field probe read the averaged E-field. Especially for the new high peak-to-average (PAR) signal types, the probes shall be linearized by PMR calibration in order to not overestimate the field reading.

The evaluation method for the MIF is defined in ANSI C63.19-2019. An RMS demodulated RF signal is fed to a spectral filter (similar to an A weighting filter) and forwarded to a temporal filter acting as a quasi-peak detector. The averaged output of these filtering is scaled to a 1 kHz 80% AM signal as reference. It may alternatively be determined through analysis and simulation, because it is constant and characteristic for a communication signal. DASY uses well-defined signals for PMR calibration. The MIF of these signals has been determined numerically. It allows a precise scaling and is therefore automatically applied.

The following table lists the MIF values evaluated by DASY manufacturer (SPEAG), and the test result will be calculated with the MIF parameter automatically. The detailed parameters for E-field probe can be found in the probe calibration report in appendix C.

UID	Reversion	Communication System Name	MIF (dB)
10021	DAC	GSM-FDD (TDMA, GMSK)	3.63
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	3.75
10460	AAA	UMTS-FDD (WCDMA, AMR)	-25.43
10225	CAB	UMTS-FDD (HSPA+)	-20.39
10081	CAB	CDMA2000 (1xRTT, RC3)	-19.71
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	3.26
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	-17.67
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	-9.76
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	-1.62
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	-1.44
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	-1.54
10769	AAD	5G NR (CP-OFDM, 1 RB, 15 MHZ, QPSK, 15 kHz)	-12.08
10973	AAB	5G NR (DFT-S-OFDM, 1 RB, 100 MHZ, QPSK, 30 kHz)	-1.64
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	-2.02
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	0.12
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	-13.44
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	-3.15
10616	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	-5.57
10671	AAC	IEEE 802.11ax (20MHz, MCSO, 90pc duty cycle)	-5.58

The MIF measurement uncertainty listed in following table is estimated by SPEAG.

4. HAC Measurement Evaluation

4.1 WD Emission Requirements

The WD's conducted power must be at or below either the stated RFAIPL (Table 4.1) or the stated peak power level (Table 4.2), or the average near-field emissions over the measurement area must be at or below the stated RFAIL (Table 4.3), or the stated peak field strength (Table 4.4). The WD may demonstrate compliance by meeting any of these four requirements, but it must do so in each of its operating bands at its established worst-case normal speech-mode operating condition.

Table 4.1 - Wireless device RF audio interference power level	
Frequency range (MHz)	**RF_{AIPL} [dBm)]**
< 960	29
960–2000	26
>2000	25

Table 4.2 - Wireless device RF peak power level	
Frequency range (MHz)	**$RF_{Peak\ Power}$ [dBm)]**
< 960	35
960–2000	32
>2000	31

Table 4.3 - Wireless device RF audio interference level	
Frequency range (MHz)	**RF_{AIL} [dB(V/m)]**
< 960	39
960–2000	36
>2000	35

Table 4.4 - Wireless device RF peak near-field level	
Frequency range (MHz)	**RF_{Peak} [dB(V/m)]**
< 960	45
960–2000	42
>2000	41

4.2 EUT Configuration and Setting

For HAC RF emission testing, the EUT was linked and controlled by base station emulator. Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during HAC testing.

4.3 System Verification

The measuring results for system check are shown as below.

Frequency (MHz)	Input Power (dBm)	Target Value (V/m)	Emax (V/m)	Deviation (%)	Test Date
835	20	105.7	110	4.07	May. 20, 2024
1880	20	86.1	85.5	-0.70	May. 20, 2024
2600	20	84.7	82.6	-2.48	May. 20, 2024
3500	20	82.5	82.9	0.48	May. 20, 2024
3900	20	80.5	79.5	-1.24	May. 20, 2024

Note:

Place a dipole antenna meeting the requirements given in ANSI C63.19: 2019 D.11 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field probe so that:

a. The probe and its cable are parallel to the coaxial feed of the dipole antenna.
b. The probe cable and the coaxial feed of the dipole antenna approach the measurement area from opposite directions.
c. The center point of the probe element(s) is 15 mm from the closest surface of the dipole elements.
d. Scan the length of the dipole with the E-field probe and record the two maximum values found near the dipole ends. Average the two readings and compare the reading to expected value in the calibration certificate or expected value in this standard.

4.4 Maximum Target Conducted Power

General Note:

1. In this report, max conducted power from each air interface was first used to evaluate whether it complies with ANSI C63.19-2019 Table 4.1 RFAIPL, compliance with table 4.1 means compliance with WD emission requirements. the RFAIPL evaluation refer to section 11.1 for detail.
2. If there some air interface were not meet ANSI C63.19-2019 table 4.1 requirement, these air interfaces were further evaluation ANSI C63.19-2019 Table 4.3 RFAIL requirement. And the RFAIL evaluation result refer to section 13.

<WWAN Max Tune-up >

Ant 0		
Air Interface		**Max. Tune-up Power (dBm)**
GSM	GSM850	34.00
	EDGE850	28.00
WCDMA	Band V	26.00
LTE FDD	Band 5	25.50
	Band 7	25.00
	Band 12	25.50
	Band 13	25.50
	Band 17	25.50
	Band 26	25.50
	Band 71	25.00
LTE TDD	Band 38	25.00
	Band 41	24.00
	Band 41 HPUE	27.00
NR FDD	n5	25.50
	n7	25.00
	n71	25.00
NR TDD	n38	25.00
	n41	24.00
	n41 HPUE	27.00

Ant 1		
Air Interface		**Max. Tune-up Power (dBm)**
GSM	GSM1900	31.00
	EDGE1900	27.00
WCDMA	Band II	25.50
	Band IV	25.50
FDD LTE	Band 2	25.00
	Band 4	25.00
	Band 25	25.00
	Band 66	25.00
FDD NR	n2	25.00
	n25	25.00
	n66	25.00

Ant 3		
Air Interface		Max. Tune-up Power (dBm)
GSM	GSM1900	31.00
	EDGE1900	27.00
WCDMA	Band II	25.50
	Band IV	25.50
FDD LTE	Band 2	25.00
	Band 4	25.00
	Band 25	25.00
	Band 66	25.00
FDD NR	n2	25.00
	n25	25.00
	n66	25.00

Ant 6		
Air Interface		Max. Tune-up Power
TDD NR	n48	24.50
	n77	25.00
	n77 HPUE	27.00
	n78	23.00
	n78 HPUE	26.00

<WLAN Max Tune-up>

Air Interface		Ant MIMO
		Max. Tune-up Power
WALN2.4G	802.11b	18.00
	802.11g	16.00
	802.11n HT20	16.00
	802.11ax HE20	17.00
	802.11n HT40	16.00
	802.11ax HE40	16.00
WLAN5G	802.11a	17.00
	802.11n HT20	16.00
	802.11ac VHT20	15.00
	802.11ax HE20	16.00
	802.11n HT40	16.00
	802.11ac VHT40	15.00
	802.11ax HE40	16.00
	802.11ac VHT80	15.00
	802.11ax HE80	15.00
WLAN6E (UNII5)	802.11ax HE20	17.00
	802.11ax HE40	17.00
	802.11ax HE80	17.00
	802.11ax HE160	17.00

4.5 Measured Conducted Power Results

General Note:

1. Use maximum power plus worst case MIF to determine whether it complies with RF_{AIPL}
2. If maximum power plus worst case MIF does not complies with RF_{AIPL}, then further evaluation RF_{AIL} include in section 13.
3. EDGE data modes is not necessary due the GSM Voice mode is the worst case.
4. According to ANSI C63.19 2019, if maximum power plus worst case MIF is complies with RF_{AIPL}, means compliance with WD emission requirements.

<WWAN>

Ant 0					
Air Interface	**Max Average Antenna Input Power (dBm)**	**Worst Case MIF (dB)**	**Power + MIF(dB)**	**C63.19 Lowest RFAIPL (dBm)**	**C63.19 test required(2019)**
GSM850	34.00	3.63	37.63	29.00	Yes
EDGE850	28.00	3.75	31.75	29.00	Yes
WCDMA	26.00	-25.43	0.57	26.00	No
WCDMA - HSPA	26.00	-20.39	5.61	26.00	No
FDD LTE	25.50	-9.76	15.74	25.00	No
TDD LTE	27.00	-1.44	25.56	25.00	Yes
FDD NR	25.50	-12.08	13.42	25.00	No
TDD NR	27.00	-1.64	25.36	25.00	Yes

Ant 1					
Air Interface	**Max Average Antenna Input Power (dBm)**	**Worst Case MIF (dB)**	**Power + MIF(dB)**	**C63.19 Lowest RFAIPL (dBm)**	**C63.19 test required(2019)**
GSM1900	31.00	3.63	34.63	26.00	Yes
EDGE1900	27.00	3.75	30.75	26.00	Yes
WCDMA	25.50	-25.43	0.07	26.00	No
WCDMA - HSPA	25.50	-20.39	5.11	26.00	No
FDD LTE	25.00	-25.43	0.07	25.00	No
FDD NR	25.00	-9.76	15.24	25.00	No

Ant 3					
Air Interface	**Max Average Antenna Input Power (dBm)**	**Worst Case MIF (dB)**	**Power + MIF(dB)**	**C63.19 Lowest RFAIPL (dBm)**	**C63.19 test required(2019)**
GSM1900	31.00	3.63	34.63	26.00	Yes
EDGE1900	27.00	3.75	30.75	26.00	Yes
WCDMA	25.50	-25.43	0.07	26.00	No
WCDMA - HSPA	25.50	-20.39	5.11	26.00	No
FDD LTE	25.00	-25.43	0.07	25.00	No
FDD NR	25.00	-9.76	15.24	25.00	No

Ant 6					
Air Interface	**Max Average Antenna Input Power (dBm)**	**Worst Case MIF (dB)**	**Power + MIF(dB)**	**C63.19 Lowest RFAIPL (dBm)**	**C63.19 test required(2019)**
TDD NR	27.00	-1.64	25.36	25.00	Yes

<WLAN>

Ant MIMO						
Frequency Bands	**Air Interface**	**Max Average Antenna Input Power (dBm)**	**Worst Case MIF (dB)**	**Power + MIF(dB)**	**C63.19 Lowest RF_{AIPL} (dBm)**	**C63.19 test required(2019)**
WLAN 2.4GHz	802.11b	18.00	-2.02	15.98	25.0	No
	802.11g	16.00	0.12	16.12	25.0	No
	802.11n HT20	16.00	-13.44	2.56	25.0	No
	802.11ax HE20	17.00	-5.58	11.42	25.0	No
	802.11n HT40	16.00	-13.44	2.56	25.0	No
	802.11ax HE40	16.00	-5.58	10.42	25.0	No
WLAN 5GHz	802.11a	17.00	-3.15	13.85	25.0	No
	802.11n HT20	16.00	-13.44	2.56	25.0	No
	802.11ac VHT20	15.00	-5.57	9.43	25.0	No
	802.11ax HE20	16.00	-5.58	10.42	25.0	No
	802.11n HT40	16.00	-13.44	2.56	25.0	No
	802.11ac VHT40	15.00	-5.57	9.43	25.0	No
	802.11ax HE40	16.00	-5.58	10.42	25.0	No
	802.11ac VHT80	15.00	-5.57	9.43	25.0	No
	802.11ax HE80	15.00	-5.58	9.42	25.0	No
WLAN6E (UNII5)	802.11ax HE20	17.00	-5.58	11.42	25.0	No
	802.11ax HE40	17.00	-5.58	11.42	25.0	No
	802.11ax HE80	17.00	-5.58	11.42	25.0	No
	802.11ax HE160	17.00	-5.58	11.42	25.0	No

4.6 HAC RF_{AIL} Emission Testing Results

General Note:

1. The HAC measurement system applies MIF value onto the measured RMS E-field, which is indirect method in ANSI C63.19-2019 version, and reports the RF audio interference level.
2. Phone Condition: Mute on; Backlight off; Max Volume.

Plot No.	Air Interface	Modulation/Mode	Sample	Channel	Ant.	Average Antenna Input Power (dBm)	MIF	RFAIL (dBV/m)
P01	GSM850	Voice	1	128	Ant0	32.54	3.63	23.86
P02	GSM850	Voice	1	189	Ant0	33.47	3.63	24.13
P03	GSM850	Voice	1	251	Ant0	33.45	3.63	23.3
P04	GSM1900	Voice	1	512	Ant1	29.39	3.63	24.08
P05	GSM1900	Voice	1	661	Ant1	30.27	3.63	24.97
P06	GSM1900	Voice	1	810	Ant1	30.59	3.63	25.95
P07	GSM1900	Voice	1	512	Ant3	29.38	3.63	30.7
P08	GSM1900	Voice	1	661	Ant3	30.21	3.63	31.76
P09	GSM1900	Voice	1	810	Ant3	30.65	3.63	32.36
	GSM1900	Voice	2	810	Ant3	30.65	3.63	30.97
P10	LTE Band 41_HPUE	20M_QPSK_1_1	1	39750	Ant0	25.27	-1.64	14.84
P11	LTE Band 41_HPUE	20M_QPSK_1_1	1	40185	Ant0	25.32	-1.64	14.99
P12	LTE Band 41_HPUE	20M_QPSK_1_1	1	40620	Ant0	25.45	-1.64	14.32
P13	LTE Band 41_HPUE	20M_QPSK_1_1	1	41055	Ant0	25.38	-1.64	13.8
P14	LTE Band 41_HPUE	20M_QPSK_1_1	1	41490	Ant0	25.49	-1.64	14.55
	LTE Band 41_HPUE	20M_QPSK_1_1	2	40185	Ant0	25.32	-1.64	13.73
P15	n41-HPUE	100M_QPSK_1_1	1	509202	Ant0	25.44	-1.64	17.29
P16	n41-HPUE	100M_QPSK_1_1	1	518598	Ant0	25.29	-1.64	17.02
P17	n41-HPUE	100M_QPSK_1_1	1	528000	Ant0	25.35	-1.64	15.72
P18	n77-HPUE	100M_QPSK_1_1	1	633334	Ant6	24.85	-1.64	25.79
P19	n77-HPUE	100M_QPSK_1_1	1	650000	Ant6	25.20	-1.64	23.45
P20	n77-HPUE	100M_QPSK_1_1	1	656000	Ant6	25.01	-1.64	23.65
P21	n77-HPUE	100M_QPSK_1_1	1	662000	Ant6	24.95	-1.64	25.59
	n77-HPUE	100M_QPSK_1_1	2	633334	Ant6	24.85	-1.64	24.38

Test Engineer: RenJie Liu and Zixiao Xia

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	CD835V3	1213	Nov. 17, 2023	3 Years
System Validation Dipole	SPEAG	CD1880V3	1203	Nov. 17, 2023	3 Years
System Validation Dipole	SPEAG	CD2600	1026	Nov. 17, 2023	3 Years
System Validation Dipole	SPEAG	CD3500	1014	Nov. 17, 2023	3 Years
Dosimetric E-field Probe	SPEAG	EF3DV3	4075	Feb.09, 2024	1 Year
Data Acquisition Electronics	SPEAG	DAE4	720	Oct. 20, 2023	1 Year
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	169210	Jun. 27, 2022	2 Year
Universal Radio Communication Tester	R&S	CMX500	101873	Oct. 08, 2023	2 Year
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510355	May. 10, 2023	1 Year
MXG Analog Signal Generator	KEYSIGHT	N5183A	MY50143024	Jan. 31, 2024	1 Year
Power Meter	Agilent	N1914A	MY52180044	Jan. 30, 2024	1 Year
Power Sensor	Agilent	E9304A H18	MY52050011	Jan. 30, 2024	1 Year
Power Meter	ANRITSU	ML2495A	1506002	Jan. 30, 2024	1 Year
Power Sensor	ANRITSU	MA2411B	1339352	Jan. 30, 2024	1 Year
Coupler	Woken	0110A056020-10	COM27RW1A3	May. 10, 2023	1 Year
Temp.&Humi.Recorder	ANYMETER	JR912	SZ01	Jun.19, 2022	2 Years
Test Arch Phantom	SPEAG	Arch	N/A	N/A	N/A

Note:

1. Referring to KDB 865664 D01 v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipole are also not physically damaged, or repaired during the interval. The dipole justification can be found in appendix C.

The return loss is < -20dB, within 20% of prior calibration, the impedance is with 5ohm of prior calibration.

6. Measurement Uncertainty

HAC Uncertainty Budget for RF 2019 version According to ANSI C63.19						
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) E**	**(Ci) H**	**Standard Uncertainty (E) (±%)**
Measurement System						
Probe Calibration	5.1	N	1	1	1	5.1
Axial Isotropy	4.7	R	1.732	1	1	2.7
Sensor Displacement	16.5	R	1.732	1	0.145	9.5
Boundary Effects	2.4	R	1.732	1	1	1.4
Phantom Boundary Effect	7.2	R	1.732	1	0	4.2
Linearity	4.7	R	1.732	1	1	2.7
Scaling with PMR calibration	10.0	R	1.732	1	1	5.8
System Detection Limit	1.0	R	1.732	1	1	0.6
Readout Electronics	0.3	N	1	1	1	0.3
Response Time	2.6	R	1.732	1	1	1.5
Integration Time	2.6	R	1.732	1	1	1.5
RF Ambient Conditions	3.0	R	1.732	1	1	1.7
RF Reflections	12.0	R	1.732	1	1	6.9
Probe Positioner	1.2	R	1.732	1	0.67	0.7
Probe Positioning	4.7	R	1.732	1	0.67	2.7
Extrap. and Interpolation	1.0	R	1.732	1	1	0.6
Test Sample Related						
Device Positioning Vertical	4.7	R	1.732	1	0.67	2.7
Device Positioning Lateral	1.0	R	1.732	1	1	0.6
Device Holder and Phantom	2.4	R	1.732	1	1	1.4
Power Drift	5.0	R	1.732	1	1	2.9
Phantom and Setup Related						
Phantom Thickness	2.4	R	1.732	1	0.67	1.4
Combined Std. Uncertainty						16.4%
Coverage Factor for 95 %						K=2
Expanded STD Uncertainty						32.7%

Uncertainty budget for HAC RF Emission

7. Information of the Testing Laboratories

We, Huarui 7layers High Technology (Suzhou) Co., Ltd., were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation.

If you have any comments, please feel free to contact us at the following:

Add: Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province
Tel: +86 (0557) 368 1008

The road map of all our labs can be found in our web site also
Web: http://www.7Layers.com

---END---

Appendix A. Plots of System Verification

HAC_E_Dipole_835

Measurement performed on May 20, 2024 at 06:32

Device Under Test

Manufacturer	Model	Dimensions [mm]	Speaker Position [mm]
		146.2 x 71.8 x 7.5	144.3

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

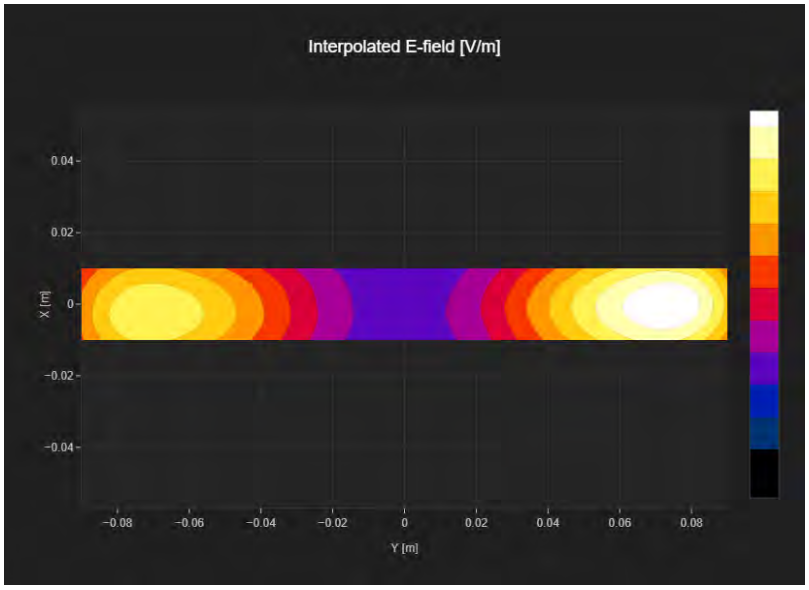
Band Name	Communication Systems Name	Channel	Frequency [MHz]
CD835	CW	50	835.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
20.0	180.0	5.0	5.0	15.0

Results

Dipole Type	Dipole Serial Number	Emax [V/m]	Drift [dB]
CD835	1213	110	0.02



HAC_E_Dipole_1880

Measurement performed on May 20, 2024 at 06:49

Device Under Test

Manufacturer	Model	Dimensions [mm]	Speaker Position [mm]
		146.2 x 71.8 x 7.5	144.3

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

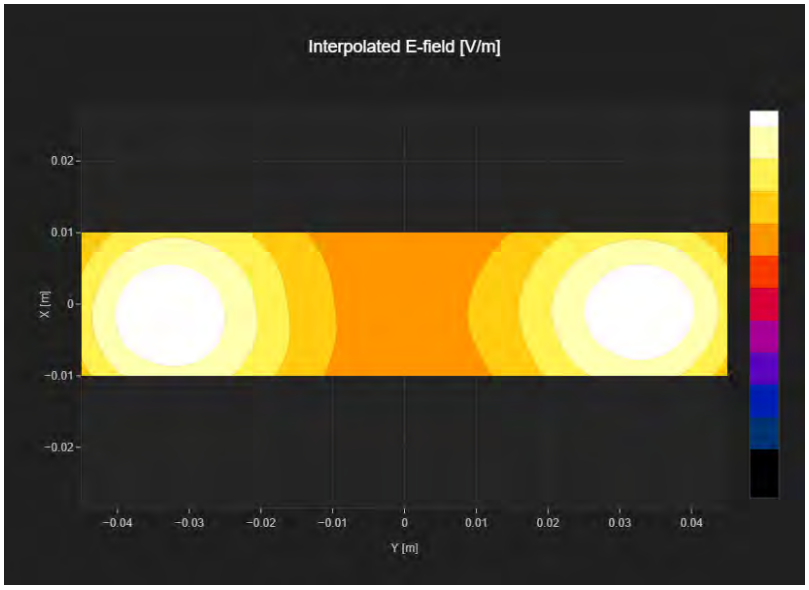
Band Name	Communication Systems Name	Channel	Frequency [MHz]
CD1880	CW	50	1880.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
20.0	90.0	5.0	5.0	15.0

Results

Dipole Type	Dipole Serial Number	Emax [V/m]	Drift [dB]
CD1880	1203	85.5	0.0



HAC_E_Dipole_2600

Measurement performed on May 20, 2024 at 06:58

Device Under Test

Manufacturer	Model	Dimensions [mm]	Speaker Position [mm]
		146.2 x 71.8 x 7.5	144.3

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

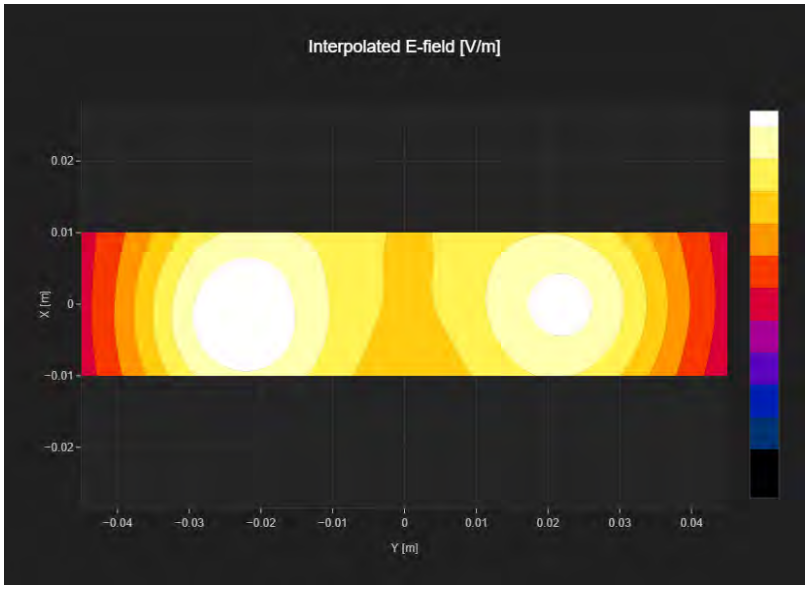
Band Name	Communication Systems Name	Channel	Frequency [MHz]
CD2600V3	CW	50	2600.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
20.0	90.0	5.0	5.0	15.0

Results

Dipole Type	Dipole Serial Number	Emax [V/m]	Drift [dB]
CD2600	1026	82.6	-0.01



HAC_E_Dipole_3500

Measurement performed on May 20, 2024 at 07:12

Device Under Test

Manufacturer	Model	Dimensions [mm]	Speaker Position [mm]
		146.2 x 71.8 x 7.5	144.3

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

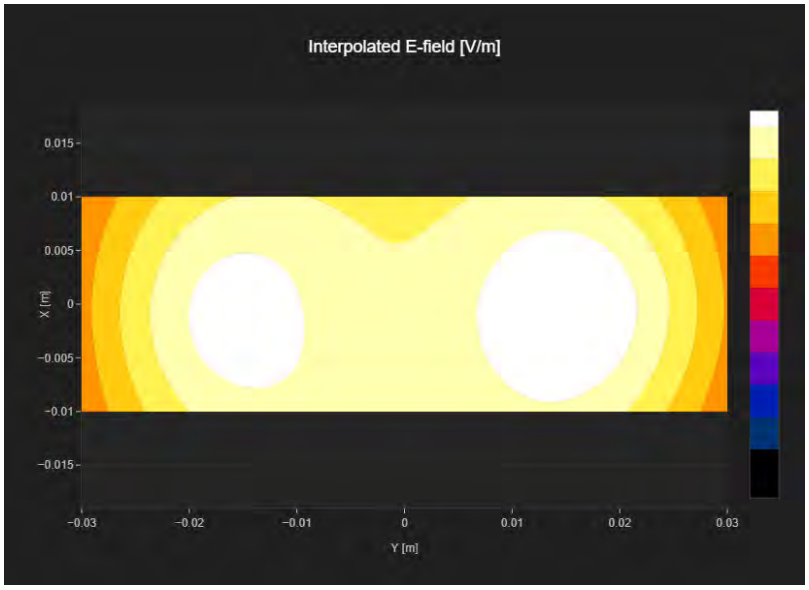
Band Name	Communication Systems Name	Channel	Frequency [MHz]
CD3500V3	CW	50	3500.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
20.0	60.0	5.0	5.0	15.0

Results

Dipole Type	Dipole Serial Number	Emax [V/m]	Drift [dB]
CD3500	1014	82.9	-0.02



HAC_E_Dipole_3900

Measurement performed on May 20, 2024 at 07:29

Device Under Test

Manufacturer	Model	Dimensions [mm]	Speaker Position [mm]
		146.2 x 71.8 x 7.5	144.3

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

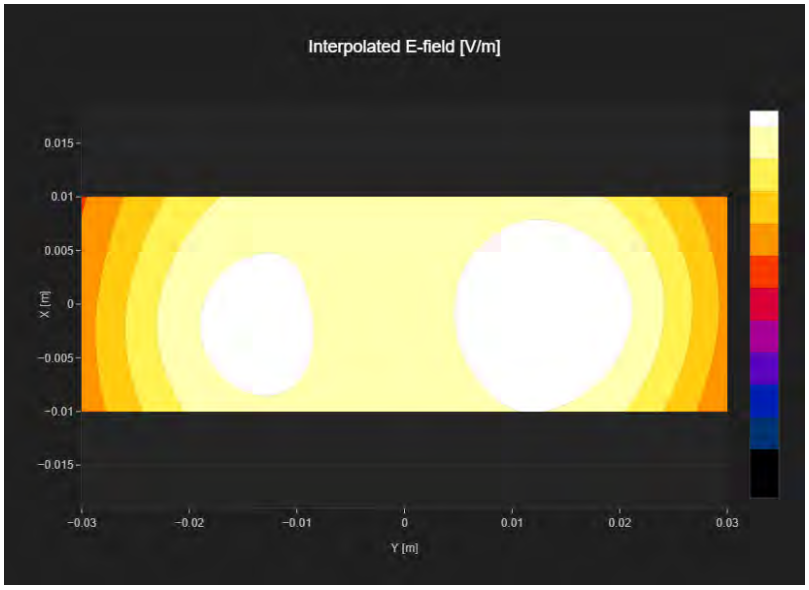
Band Name	Communication Systems Name	Channel	Frequency [MHz]
CD3500V3	CW	0	3900.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
20.0	60.0	5.0	5.0	15.0

Results

Dipole Type	Dipole Serial Number	Emax [V/m]	Drift [dB]
CD3500	1014	79.5	-0.03



Appendix B. Plots of HAC RF Emission Measurement

P01_HAC RF_GSM850_Voice_CH128_E

Measurement performed on May 20, 2024 at 09:59

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

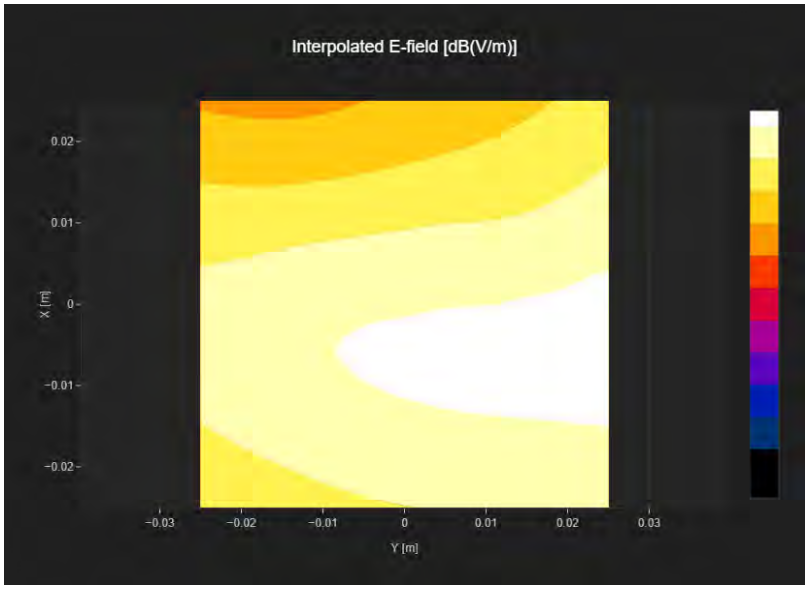
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	128	824.2

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
22.3	20.23	3.63	23.86



P02_HAC RF_GSM850_Voice_CH189_E

Measurement performed on May 20, 2024 at 10:09

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

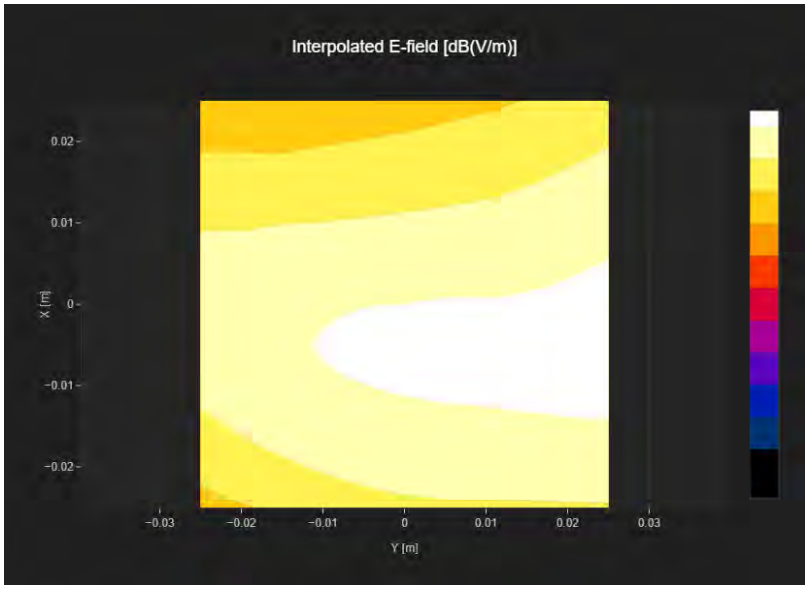
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	189	836.4

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
22.4	20.5	3.63	24.13



P03_HAC RF_GSM850_Voice_CH251_E

Measurement performed on May 20, 2024 at 10:18

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

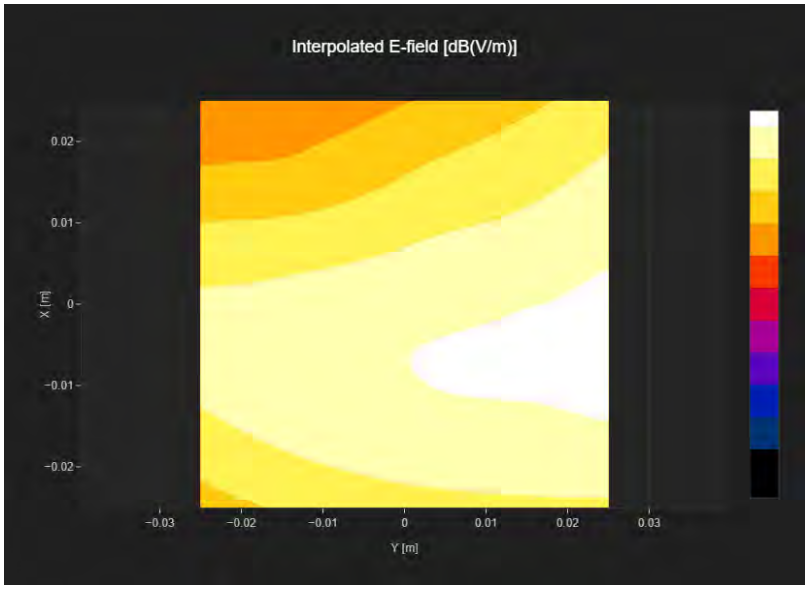
Band Name	Communication Systems Name	Channel	Frequency [MHz]
GSM 850	GSM-FDD (TDMA, GMSK)	251	848.8

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
22.05	19.67	3.63	23.3



P04_HAC RF_GSM1900_Voice_CH512_E_Ant1

Measurement performed on May 20, 2024 at 10:27

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

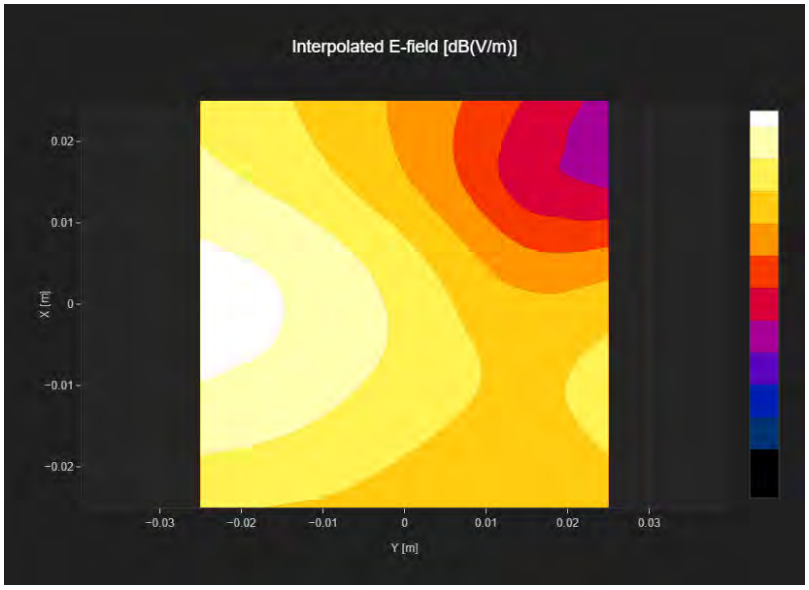
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	512	1850.2

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
24.45	20.45	3.63	24.08



P05_HAC RF_GSM1900_Voice_CH661_E_Ant1

Measurement performed on May 20, 2024 at 10:43

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

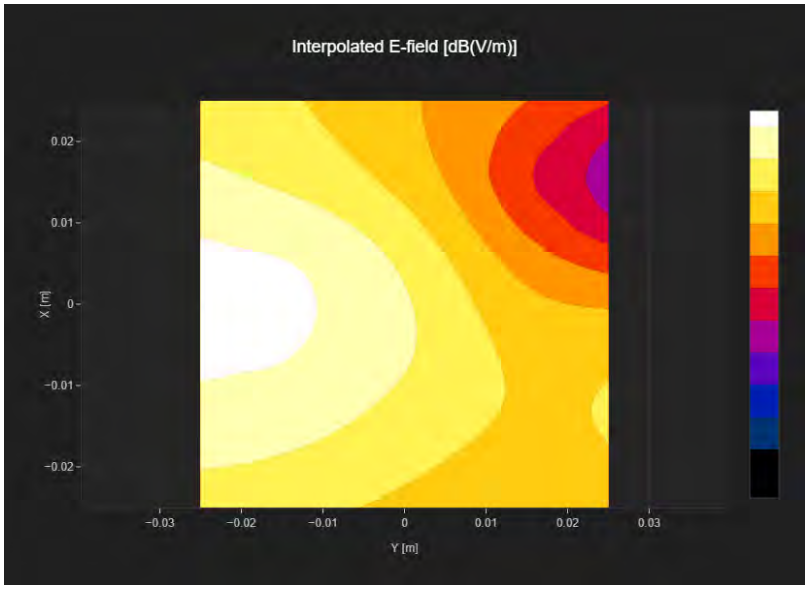
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	661	1880.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
24.96	21.34	3.63	24.97



P06_HAC RF_GSM1900_Voice_CH810_E_Ant1

Measurement performed on May 20, 2024 at 10:50

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

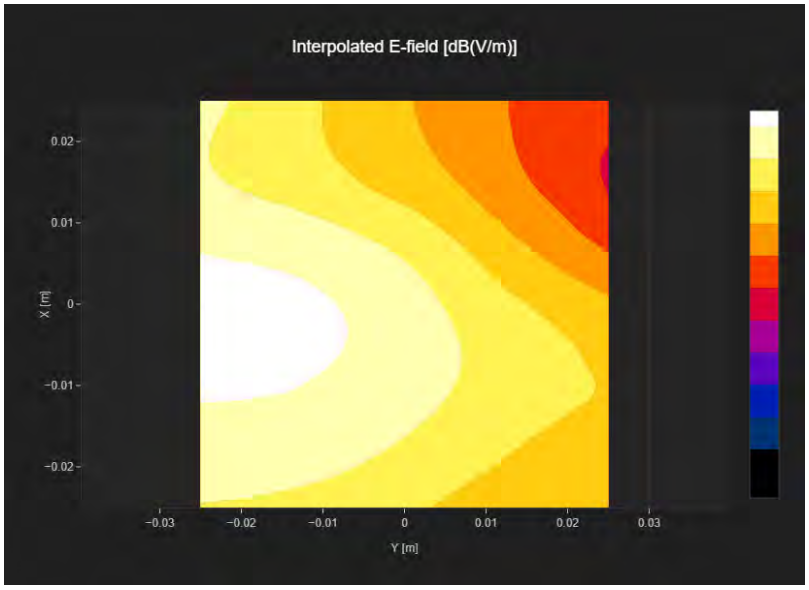
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	810	1909.8

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
25.49	22.32	3.63	25.95



P07_HAC RF_GSM1900_Voice_CH512_E_Ant3

Measurement performed on May 20, 2024 at 11:04

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

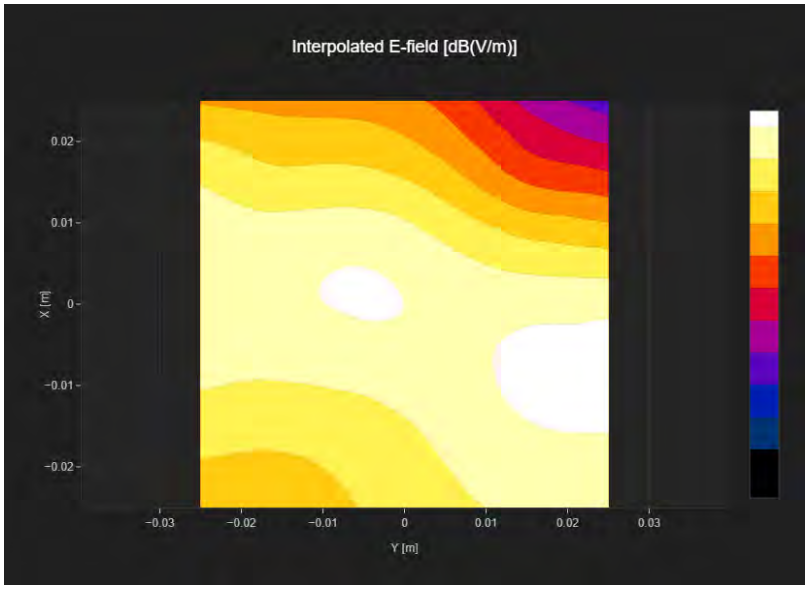
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	512	1850.2

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
29.34	27.07	3.63	30.7



P08_HAC RF_GSM1900_Voice_CH661_E_Ant3

Measurement performed on May 20, 2024 at 11:09

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

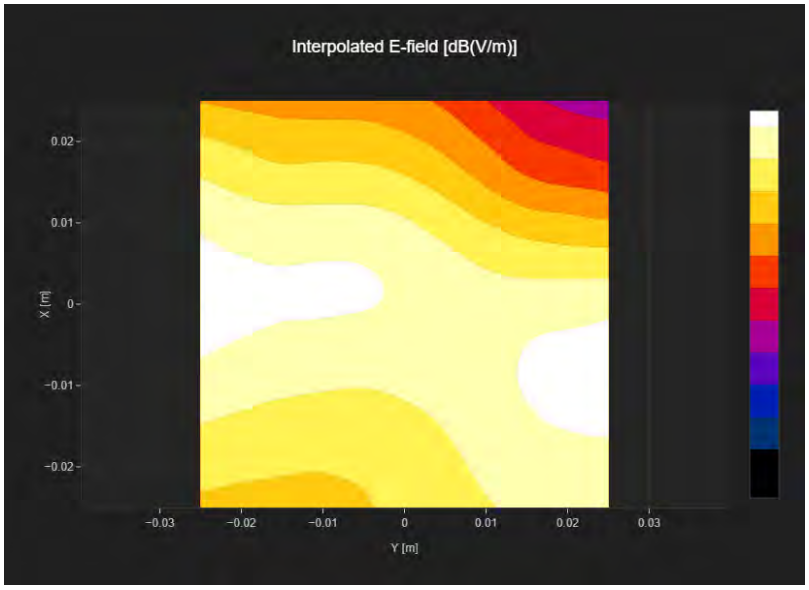
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	661	1880.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
30.36	28.13	3.63	31.76



P09_HAC RF_GSM1900_Voice_CH810_E_Ant3

Measurement performed on May 20, 2024 at 11:15

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

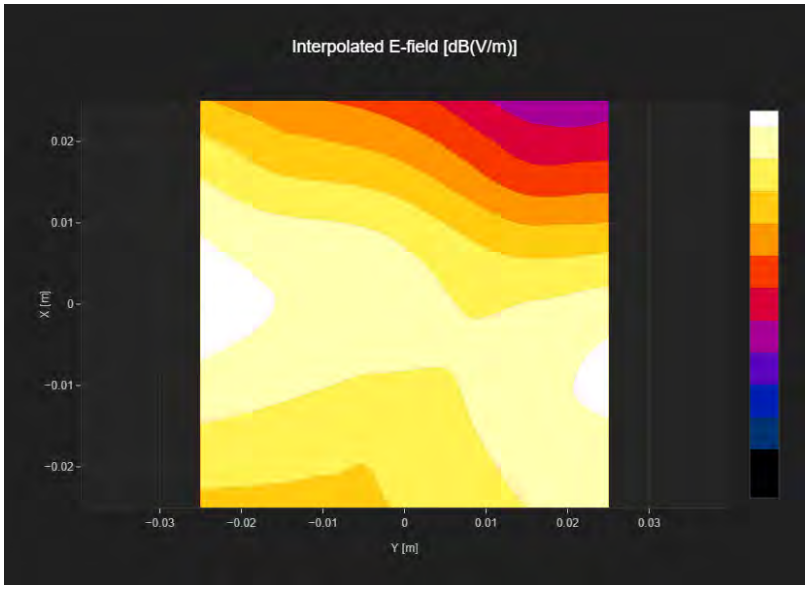
Band Name	Communication Systems Name	Channel	Frequency [MHz]
PCS 1900	GSM-FDD (TDMA, GMSK)	810	1909.8

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
31.99	28.73	3.63	32.36



P10_HAC RF_LTE Band 41_CH39750_E

Measurement performed on May 20, 2024 at 11:28

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

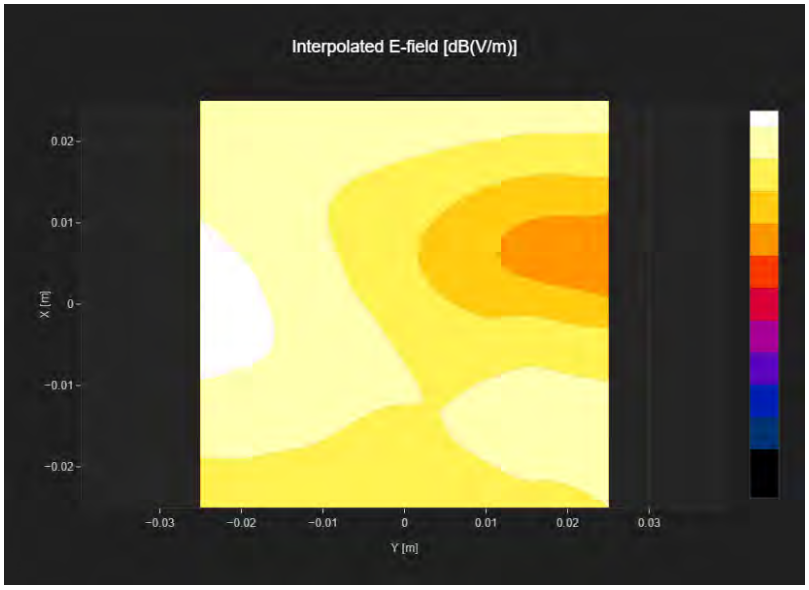
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41, E-UTRA/TDD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	39750	2506.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
17.03	16.46	-1.62	14.84



P11_HAC RF_LTE Band 41_CH40185_E

Measurement performed on May 20, 2024 at 11:37

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	ctober 20, 2023

Communication Systems

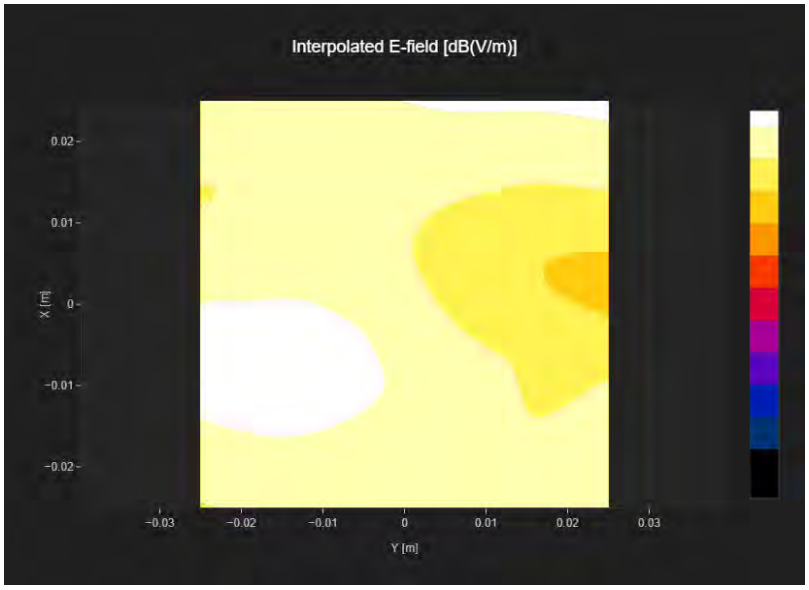
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41, E-UTRA/TDD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	40185	2549.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
18.37	16.61	-1.62	14.99



P12_HAC RF_LTE Band 41_CH40620_E

Measurement performed on May 20, 2024 at 11:45

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

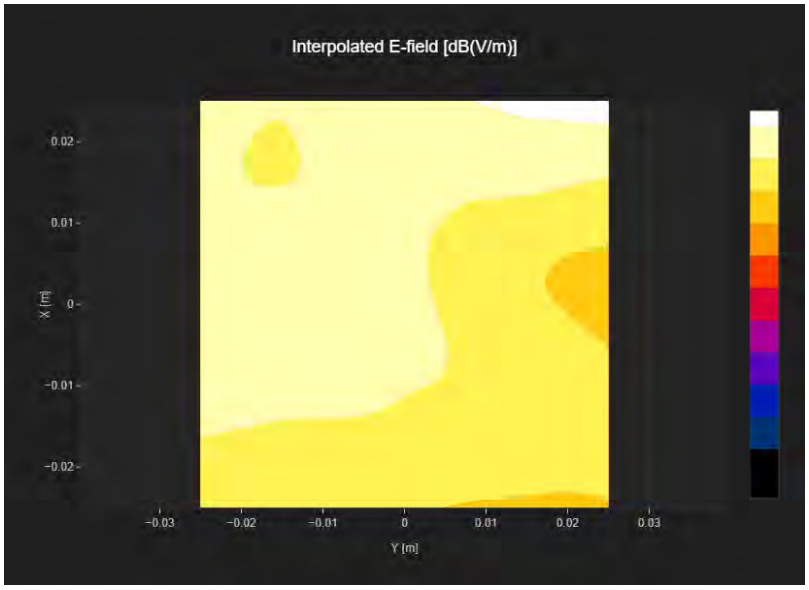
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41, E-UTRA/TDD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	40620	2593.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
18.41	15.94	-1.62	14.32



P13_HAC RF_LTE Band 41_CH41055_E

Measurement performed on May 20, 2024 at 11:51

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

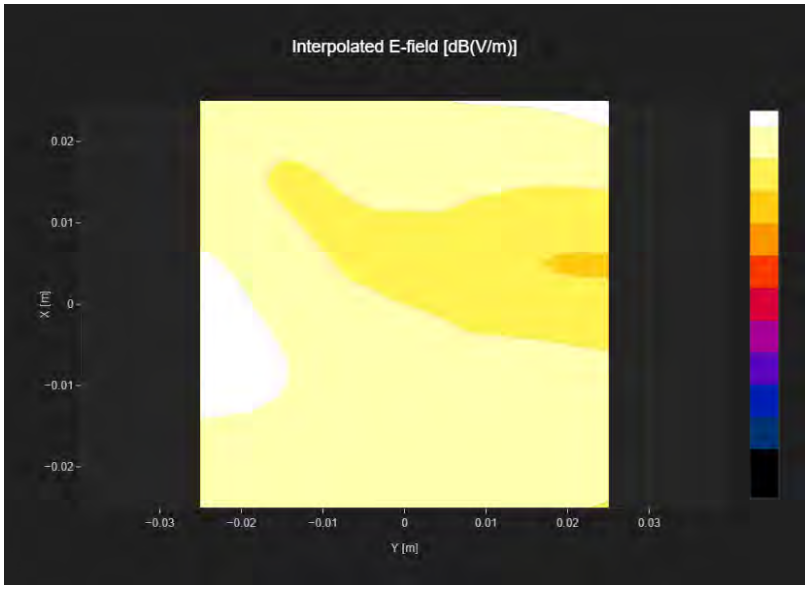
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41, E-UTRA/TDD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	41055	2636.5

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
17.24	15.42	-1.62	13.8



P14_HAC RF_LTE Band 41_CH41490_E

Measurement performed on May 20, 2024 at 11:59

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

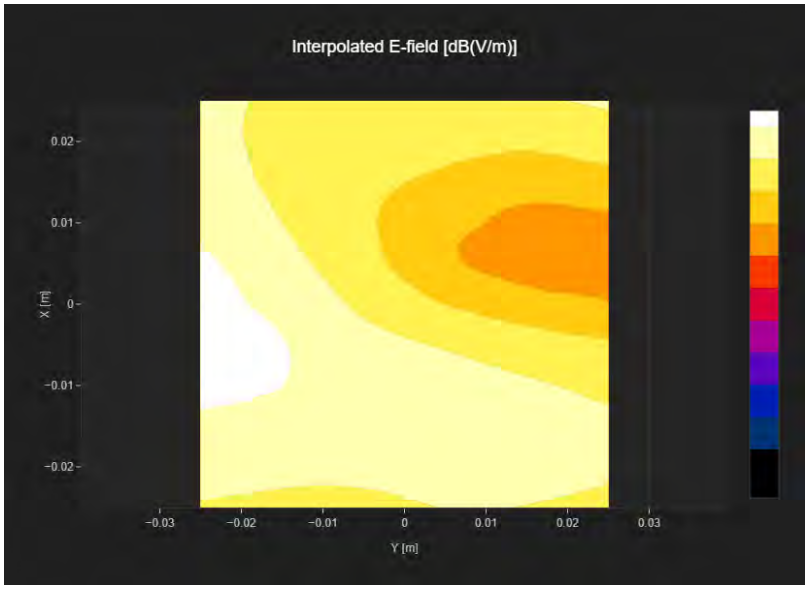
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band 41, E-UTRA/TDD	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	41490	2680.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
18.95	16.17	-1.62	14.55



P15_HAC RF_NR Band n41_CH509202_E

Measurement performed on May 20, 2024 at 12:18

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

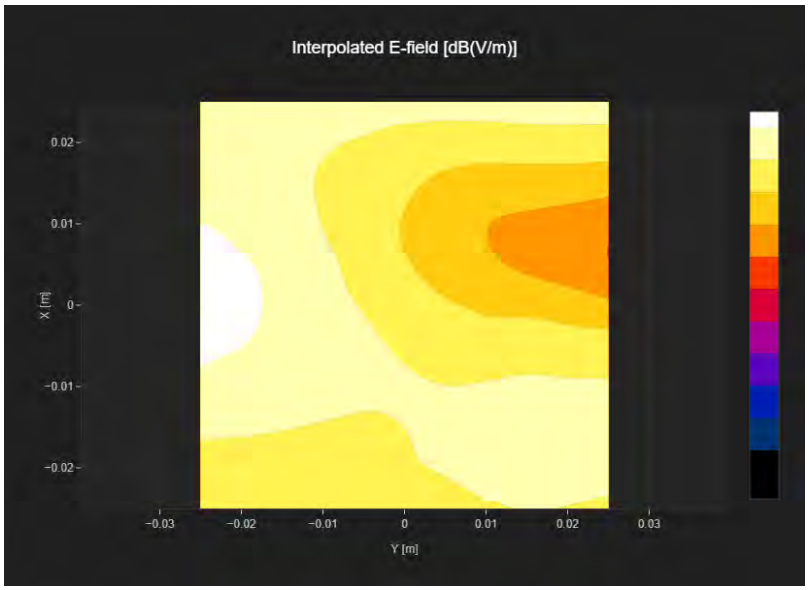
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n41	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	509202	2546.01

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
19.78	18.93	-1.64	17.29



P16_HAC RF_NR Band n41_CH518598_E

Measurement performed on May 20, 2024 at 12:32

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

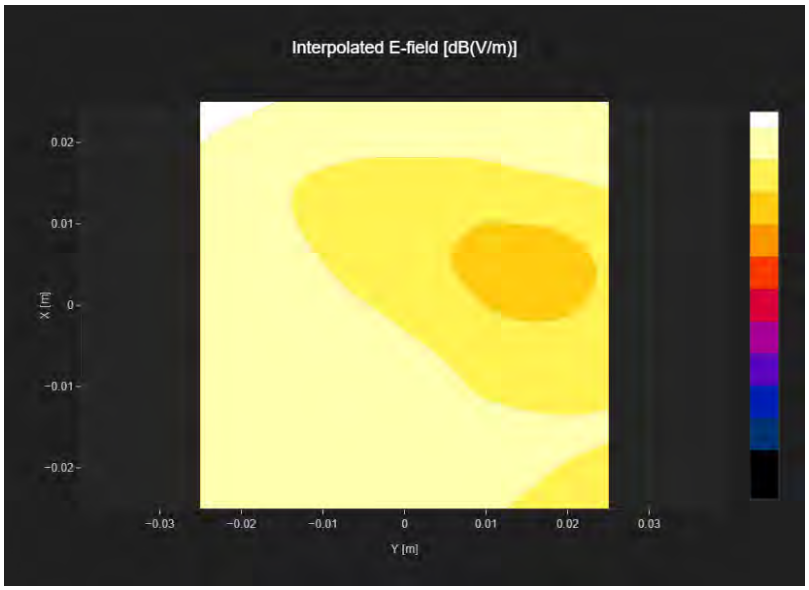
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n41	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	518598	2592.99

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
20.19	18.66	-1.64	17.02



P17_HAC RF_NR Band n41_CH528000_E

Measurement performed on May 20, 2024 at 12:45

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

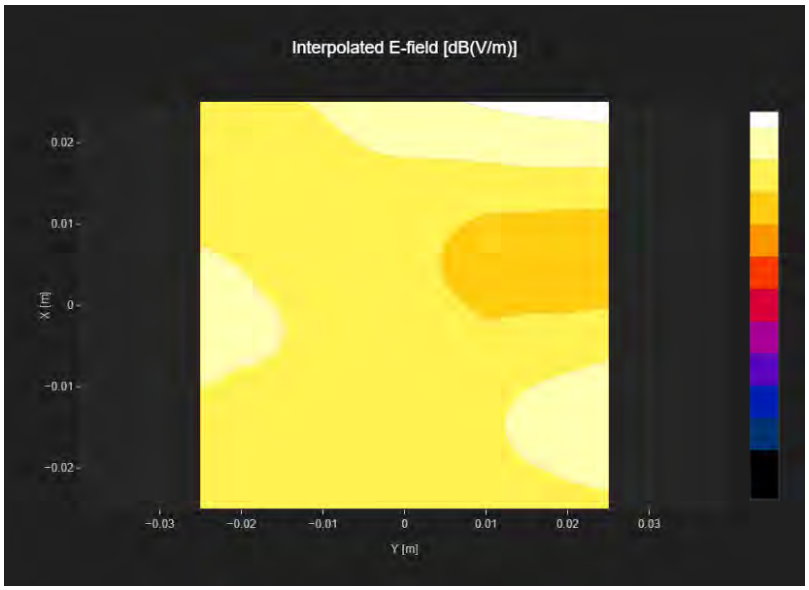
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n41	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	528000	2640.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
20.42	17.36	-1.64	15.72



P18_HAC RF_NR Band n77_CH633334_E

Measurement performed on May 20, 2024 at 12:58

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

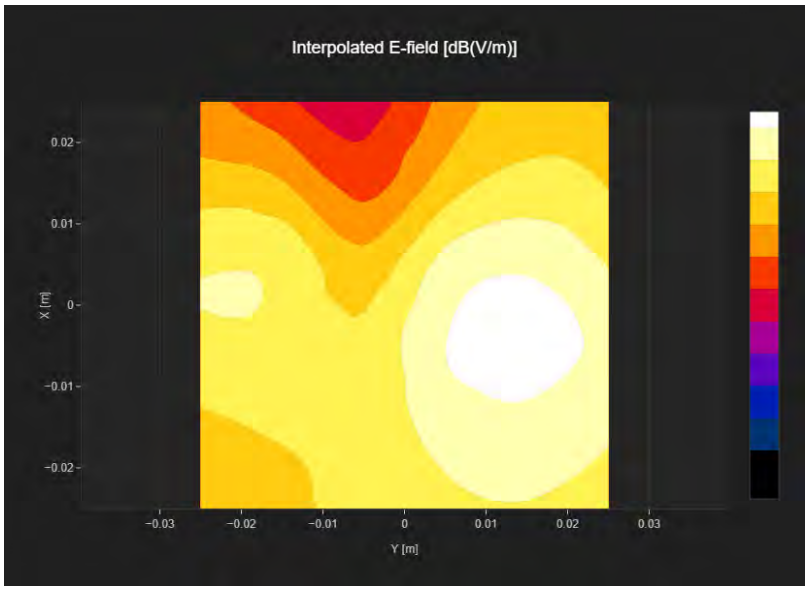
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n77	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	633334	3500.01

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
30.8	27.43	-1.64	25.79



P19_HAC RF_NR Band n77_CH650000_E

Measurement performed on May 20, 2024 at 13:07

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

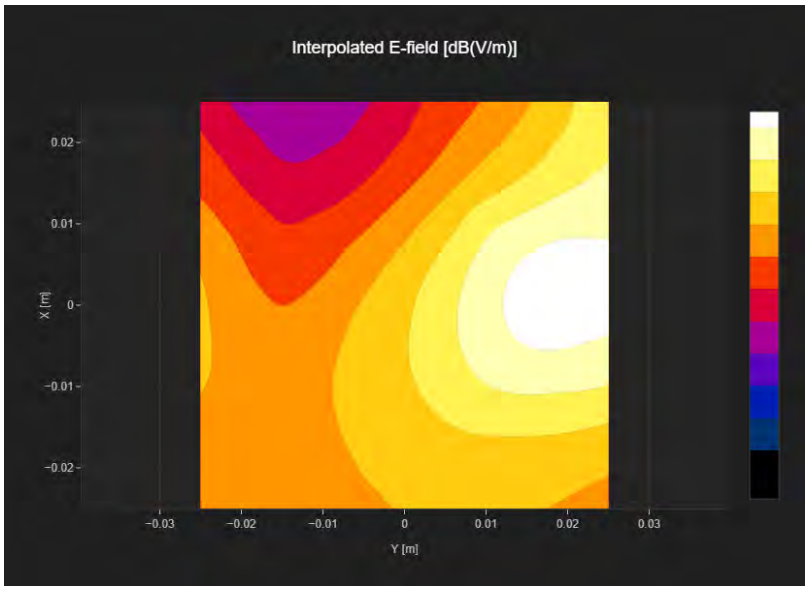
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n77	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	650000	3750.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
30.23	25.09	-1.64	23.45



P20_HAC RF_NR Band n77_CH656000_E

Measurement performed on May 20, 2024 at 13:22

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

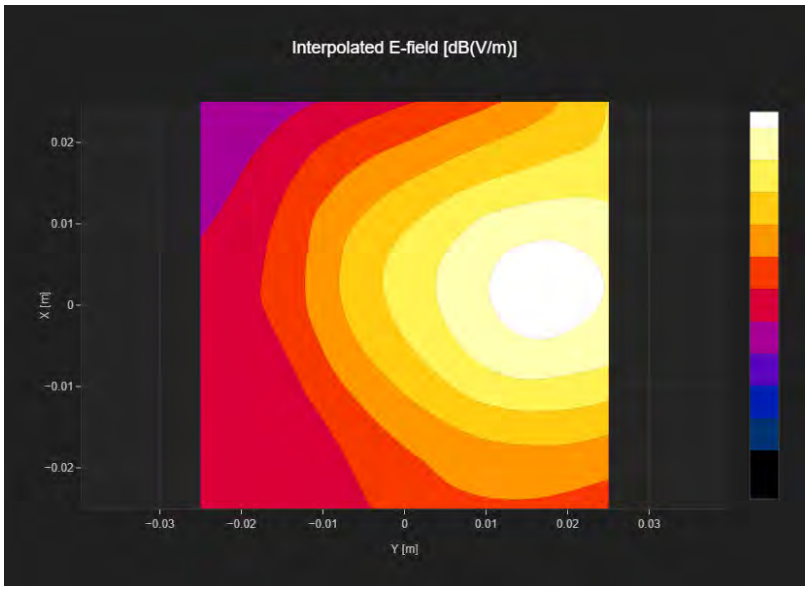
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n77	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	656000	3840.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
31.09	25.29	-1.64	23.65



P21_HAC RF_NR Band n77_CH662000_E

Measurement performed on May 20, 2024 at 13:31

Device Under Test

Manufacturer	Model	Dimensions[mm]	Speaker Position [mm]
		160.0 x 71.8 x 10.0	158.5

Hardware Setup

Probe Name	Probe Calibration Date	DAE Name	DAE Calibration Date
EF3DV3 - SN4075	February 09, 2024	DAE4 Sn720	October 20, 2023

Communication Systems

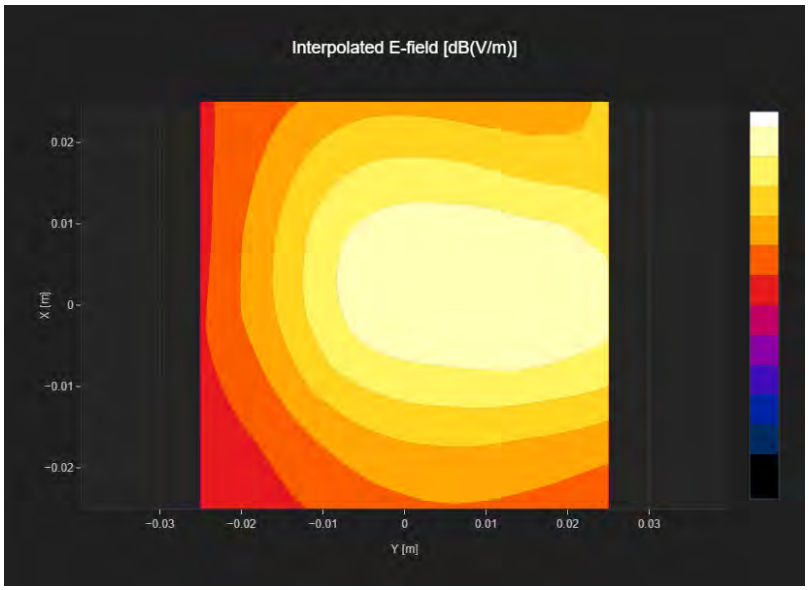
Band Name	Communication Systems Name	Channel	Frequency [MHz]
Band n77	5G NR (DFT-s-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)	662000	3930.0

Grid Settings

Extent X [mm]	Extent Y [mm]	Step X [mm]	Step Y [mm]	Distance [mm]
50.0	50.0	10.0	10.0	15.0

Results

Emax [dB(V/m)]	Eavg50x50 max [dB(V/m)]	MIF [dB]	RFail [dB(V/m)]
31.0	27.23	-1.64	25.59



Appendix C. Calibration Certificate for Probe and Dipole

In Collaboration with
CALIBRATION LABORATORY

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn http://www.caict.ac.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client : SRTC

Certificate No: 23J02Z80084

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 720
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)
Calibration date:	October 20, 2023

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	12-Jun-23 (CTTL, No.J23X05436)	Jun-24

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 26, 2023

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn http://www.caict.ac.cn

Glossary:

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.

- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.

- The report provide only calibration results for DAE, it does not contain other performance test results.

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn http://www.caict.ac.cn

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV
Low Range: 1LSB = 61nV , full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	403.301 ± 0.15% (k=2)	404.722 ± 0.15% (k=2)	403.178 ± 0.15% (k=2)
Low Range	3.93392 ± 0.7% (k=2)	3.95149 ± 0.7% (k=2)	3.95849 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	295.5° ± 1 °

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

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Accreditation No.: SCS 0108

Client **7Layer**
Suzhou

Certificate No. **EF-4075_Feb24**

CALIBRATION CERTIFICATE

Object	EF3DV3 - SN:4075
Calibration procedure(s)	QA CAL-02.v9, QA CAL-25.v8 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date	February 09, 2024

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3) °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP2	SN: 104778	30-Mar-23 (No. 217-03804/03805)	Mar-24
Power sensor NRP-Z91	SN: 103244	30-Mar-23 (No. 217-03804)	Mar-24
Power sensor NRP-Z91	SN: 103245	30-Mar-23 (No. 217-03805)	Mar-24
Reference 20 dB Attenuator	SN: CC2552 (20x)	30-Mar-23 (No. 217-03809)	Mar-24
DAE4	SN: 789	18-Oct-23 (No. DAE4-789_Oct23)	Oct-24
Reference Probe ER3DV6	SN: 2328	02-Oct-23 (No. ER3-2328_Oct23)	Oct-24

Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-22)	In house check: Jun-24
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-22)	In house check: Jun-24
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24

	Name	Function	Signature
Calibrated by	Jeton Kastrati	Laboratory Technician	
Approved by	Sven Kühn	Technical Manager	

Issued: February 09, 2024

Glossary

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
En	incident E-field orientation normal to probe axis
Ep	incident E-field orientation parallel to probe axis
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005
b) CTIA Test Plan for Hearing Aid Compatibility, Rev 3.1.1, May 2017

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz in R22 waveguide).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart).
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal. DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Parameters of Probe: EF3DV3 - SN:4075

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc ($k = 2$)
Norm ($\mu V/(V/m)^2$)	1.03	1.03	1.43	±10.1%
DCP (mV) [B]	97.1	94.5	94.6	±4.7%

Calibration Results for Frequency Response (30 MHz – 5.8 GHz)

Frequency MHz	Target E-field (En) V/m	Measured E-field (En) V/m	Deviation E-field (En)	Target E-field (Ep) V/m	Measured E-field (Ep) V/m	Deviation E-field (Ep)	Unc ($k = 2$)
30	77.1	77.2	0.1%	77.1	77.2	0.1%	±5.1%
100	77.0	78.0	1.2%	76.9	77.8	1.1%	±5.1%
450	77.2	78.3	1.4%	77.2	78.1	1.1%	±5.1%
600	77.2	77.8	0.7%	77.2	77.6	0.4%	±5.1%
750	77.2	77.5	0.4%	77.2	77.3	0.1%	±5.1%
1800	143.3	140.2	−2.2%	143.3	140.2	−2.1%	±5.1%
2000	135.1	129.6	−4.1%	135.0	129.5	−4.1%	±5.1%
2200	127.7	124.6	−2.4%	127.7	125.8	−1.5%	±5.1%
2500	125.4	120.2	−4.1%	125.4	121.2	−3.4%	±5.1%
3000	79.4	76.2	−4.1%	79.3	77.2	−2.7%	±5.1%
3500	256.2	255.4	−0.3%	256.2	252.0	−1.6%	±5.1%
3700	249.6	244.6	−2.0%	249.8	242.7	−2.8%	±5.1%
5200	50.8	50.9	0.2%	50.8	51.1	0.8%	±5.1%
5500	49.6	48.8	−1.7%	49.7	49.2	−1.0%	±5.1%
5800	48.9	47.9	−2.0%	48.9	47.6	−2.6%	±5.1%

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[B] Linearization parameter uncertainty for maximum specified field strength.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EF3DV3 - SN:4075

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B $dB\sqrt{\mu V}$	C	D dB	VR mV	Max dev.	Max Unc^E $k = 2$
0	CW	X	0.00	0.00	1.00	0.00	150.7	±2.7%	±4.7%
		Y	0.00	0.00	1.00		150.1		
		Z	0.00	0.00	1.00		136.6		
10352	Pulse Waveform (200Hz, 10%)	X	3.68	69.27	12.11	10.00	60.0	±2.5%	±9.6%
		Y	20.00	89.90	19.89		60.0		
		Z	4.23	71.09	12.56		60.0		
10353	Pulse Waveform (200Hz, 20%)	X	3.06	70.41	11.54	6.99	80.0	±1.0%	±9.6%
		Y	20.00	91.55	19.36		80.0		
		Z	6.11	77.07	13.62		80.0		
10354	Pulse Waveform (200Hz, 40%)	X	7.66	80.65	13.79	3.98	95.0	±0.7%	±9.6%
		Y	20.00	94.12	19.10		95.0		
		Z	20.00	88.78	15.76		95.0		
10355	Pulse Waveform (200Hz, 60%)	X	20.00	89.55	15.37	2.22	120.0	±0.8%	±9.6%
		Y	20.00	96.87	19.16		120.0		
		Z	20.00	93.10	16.61		120.0		
10387	QPSK Waveform, 1 MHz	X	1.93	69.81	16.79	1.00	150.0	±1.8%	±9.6%
		Y	1.91	68.02	16.12		150.0		
		Z	1.99	71.05	17.37		150.0		
10388	QPSK Waveform, 10 MHz	X	2.42	70.01	17.04	0.00	150.0	±1.1%	±9.6%
		Y	2.45	69.30	16.52		150.0		
		Z	2.52	71.01	17.66		150.0		
10396	64-QAM Waveform, 100 kHz	X	2.63	70.84	19.40	3.01	150.0	±2.4%	±9.6%
		Y	2.70	69.76	18.95		150.0		
		Z	1.85	66.00	18.16		150.0		
10399	64-QAM Waveform, 40 MHz	X	3.51	67.36	16.14	0.00	150.0	±1.3%	±9.6%
		Y	3.54	67.08	15.94		150.0		
		Z	3.58	67.78	16.48		150.0		
10414	WLAN CCDF, 64-QAM, 40 MHz	X	4.76	65.65	15.72	0.00	150.0	±2.5%	±9.6%
		Y	4.89	65.50	15.63		150.0		
		Z	4.81	65.95	16.00		150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[B] Linearization parameter uncertainty for maximum specified field strength.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Parameters of Probe: EF3DV3 - SN:4075

Sensor Frequency Model Parameters

	Sensor X	Sensor Y	Sensor Z
Frequency Corr. (LF)	-0.06	0.01	5.60
Frequency Corr. (HF)	2.82	2.82	2.82

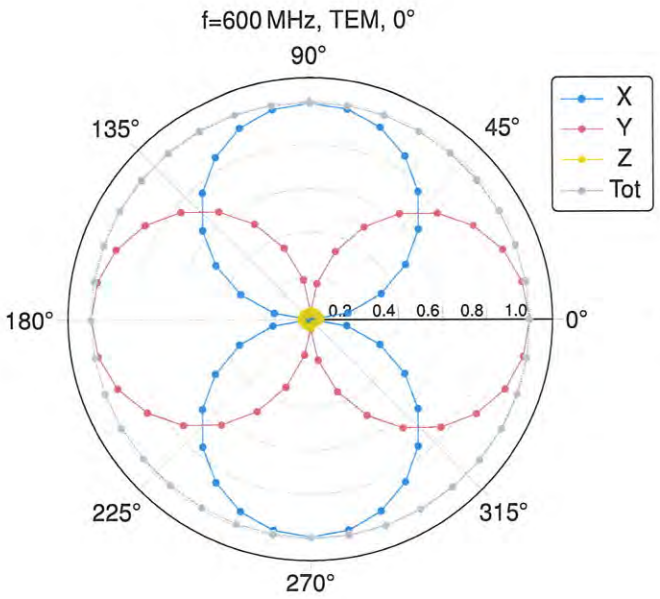
Sensor Model Parameters

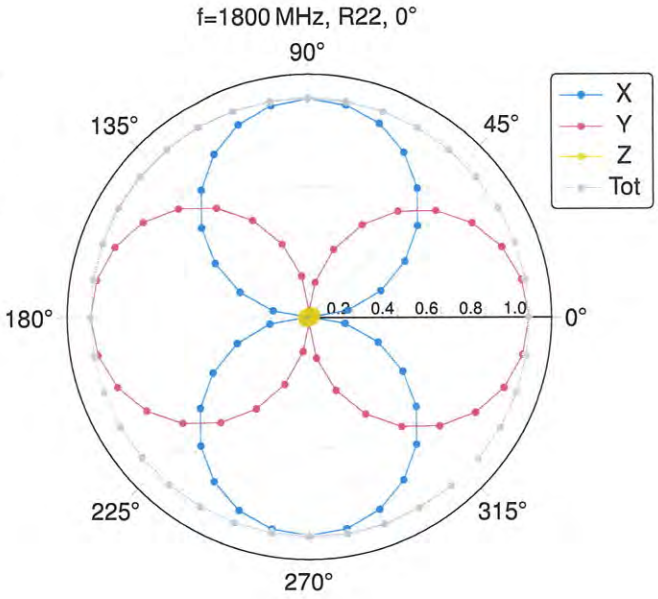
	C1 fF	C2 fF	α V^{-1}	T1 $ms\,V^{-2}$	T2 $ms\,V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
x	42.4	278.03	36.36	6.53	0.29	4.98	0.78	0.11	1.00
y	53.5	357.27	37.48	8.15	0.19	5.04	0.00	0.33	1.01
z	39.7	265.72	37.77	5.31	0.05	5.01	0.00	0.02	1.01

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle	66.8°
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	12 mm
Tip Length	25 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	1.5 mm
Probe Tip to Sensor Y Calibration Point	1.5 mm
Probe Tip to Sensor Z Calibration Point	1.5 mm

Receiving Pattern (ϕ), $\vartheta = 0°$





Receiving Pattern (ϕ), $\vartheta = 90°$