

TECHNICAL REPORT



Case studies supporting IEC 62232 – Determination of RF field strength, power density and sar in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure



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CONTENTS

FOREWORD.....	10
INTRODUCTION.....	12
1 Scope.....	13
2 Normative references	13
3 Terms and definitions	13
4 Symbols and abbreviations.....	17
4.1 Physical quantities	17
4.2 Constants	17
4.3 Abbreviated terms.....	17
5 Overview of case studies.....	18
6 Indoor small cell product compliance assessment using SAR measurements.....	20
6.1 General description.....	20
6.2 Implementation of IEC 62232:2017	20
6.2.1 Evaluation process	20
6.2.2 Methodology.....	21
6.2.3 Reporting.....	22
6.3 Technical outcome.....	22
6.4 Lessons learned	22
7 Outdoor small cell product compliance assessment using SAR measurements	23
7.1 General description.....	23
7.2 Implementation of IEC 62232:2017	23
7.2.1 Evaluation process	23
7.2.2 Methodology.....	24
7.2.3 Reporting.....	24
7.3 Technical outcome.....	24
7.4 Lessons learned	24
8 Small cell product installation compliance assessment using simplified installation criteria.....	24
8.1 General description.....	24
8.2 Implementation of IEC 62232:2017	25
8.2.1 Evaluation process	25
8.2.2 Methodology.....	26
8.2.3 Reporting.....	26
8.3 Technical outcome.....	26
8.4 Lessons learned	27
9 Small cell site in-situ measurements.....	27
9.1 General description.....	27
9.2 Implementation of IEC 62232:2017 for measurement Campaign A	27
9.2.1 Evaluation process	27
9.2.2 Methodology.....	28
9.2.3 Reporting.....	29
9.3 Implementation of IEC 62232:2017 for measurement Campaign B	29
9.3.1 General description	29
9.3.2 Case B (comprehensive exposure evaluation)	30
9.3.3 Reporting.....	31
9.4 Lessons learned	31

10	Street cell product compliance assessment using SAR measurements and power density spatial averaging	31
10.1	General description.....	31
10.2	Implementation of IEC 62232:2017	32
10.2.1	Evaluation process	32
10.2.2	Methodology.....	32
10.2.3	Reporting.....	33
10.3	Technical outcome.....	33
10.4	Validation study	33
10.4.1	Validation process	33
10.4.2	Comparison of spatial average field strength and whole-body SAR results	34
10.5	Lessons learned	34
11	Macro site in-situ measurements	34
11.1	General description.....	34
11.2	Implementation of IEC 62232:2017	35
11.2.1	Evaluation process	35
11.2.2	Methodology.....	36
11.2.3	Reporting.....	36
11.3	Technical outcome.....	36
11.4	Lessons learned	36
12	Macro site in-situ measurements using drones	36
12.1	General description.....	36
12.2	Implementation	37
12.2.1	Evaluation system	37
12.2.2	Evaluation process and methodology.....	38
12.2.3	Reporting.....	38
12.3	Technical outcome.....	38
12.4	Lessons learned	39
13	RF exposure assessment based on actual maximum transmitted power or EIRP	39
13.1	General guidelines.....	39
13.1.1	Technical background and rationale	39
13.1.2	Guiding principles for conducting RF exposure assessment based on the actual maximum approach	42
13.1.3	EIRP evaluation assumptions	42
13.1.4	Technology duty cycle factor assumptions	43
13.1.5	Expected outcome of actual maximum approaches	45
13.2	Modelling studies for BS using mMIMO	45
13.2.1	Guiding principles.....	45
13.2.2	Simulation model parameters	45
13.2.3	Modelling case study A.....	47
13.2.4	Modelling case study B.....	49
13.2.5	Modelling case study C.....	51
13.2.6	Lessons learned	53
13.3	Measurement studies on operational sites with BS using mMIMO	54
13.3.1	Guiding principles.....	54
13.3.2	Measurement campaign parameters	54
13.3.3	Experiment process	55
13.3.4	Examples of RF exposure experiments	57

13.3.5	Lessons learned	61
13.4	Configurations with multiple transmitters	62
13.4.1	Guiding principles for configurations with multiple transmitters	62
13.4.2	Rationale	62
13.4.3	Power combination factors applicable to configurations with multiple transmitters	64
13.4.4	Lessons learned	65
14	Macro BS with massive MIMO product compliance assessment	65
14.1	General description	65
14.2	Implementation of IEC 62232:2017	66
14.2.1	Evaluation process	66
14.2.2	Methodology	66
14.2.3	Reporting	67
14.3	Technical outcome	67
14.4	Lessons learned	68
15	Macro site with massive MIMO product installation compliance assessment	68
15.1	General description	68
15.2	Implementation of IEC 62232:2017	69
15.2.1	Evaluation process	69
15.2.2	Methodology	69
15.2.3	Reporting	70
15.3	Technical outcome	70
15.4	Lessons learned	71
16	Small cell products at millimetre-wave frequency using massive MIMO	71
16.1	General description	71
16.2	Indoor product installation case study	72
16.2.1	Product configurations	72
16.2.2	Implementation of IEC 62232:2017	72
16.2.3	Technical outcome	73
16.2.4	Lessons learned	73
16.3	In-situ measurement case study	73
16.3.1	Product configurations	73
16.3.2	Implementation of IEC 62232:2017	74
16.3.3	Technical outcome	75
16.3.4	Lessons learned	77
17	Wireless link with parabolic dish antenna product compliance assessment	77
17.1	General description	77
17.2	Implementation of IEC 62232:2017	78
17.2.1	Evaluation process	78
17.2.2	Methodology	79
17.2.3	Reporting	79
17.3	Technical outcome	79
17.4	Lessons learned	81
Annex A (informative)	Technical information supporting the case study "Indoor small cell product compliance assessment using SAR measurements" (Clause 6)	82
A.1	Technical details	82
A.2	Test report	82
Annex B (informative)	Technical information supporting the case study "Outdoor small cell product compliance assessment using SAR measurements" (Clause 7)	83

B.1	Physical parameters of the EUT antenna	83
B.2	Measurement set-up	83
B.3	Measurement results.....	84
B.4	Test report	84
Annex C (informative) Technical information supporting the case study "Small cell product installation compliance assessment using simplified installation criteria" (Clause 8)		85
C.1	3GPP categories of base stations	85
C.2	E0 installation class case study – Touch compliant	85
C.3	E2 installation class case study	86
C.4	E10 installation class case study.....	87
C.5	E100 installation class case	88
C.6	E+ installation class case study	90
Annex D (informative) Technical information supporting the case study "Small cell site in-situ measurements" (Clause 9)		93
D.1	General description and note	93
D.2	Technical information and results for measurement Campaign A.....	93
D.3	Technical information for measurement Campaign B.....	98
D.3.1	General description	98
D.3.2	Measurement process	98
D.3.3	Results	99
D.3.4	Measurement uncertainty.....	101
D.3.5	Test report for measurement Campaign B.....	101
Annex E (informative) Technical information supporting the case study "Street cell product compliance assessment using SAR measurements and power density spatial averaging" (Clause 10)		102
Annex F (informative) Technical information supporting the case study "Macro site in-situ measurements" (Clause 11)		103
F.1	Technical information used for performing the tests	103
F.2	Test report	103
Annex G (informative) Technical information supporting the case study "Macro site in-situ measurements using drones" (Clause 12)		104
G.1	Technical parameters of the measurement system.....	104
G.2	Technical parameters of the drone.....	104
G.3	Description of the BS measurement site.....	104
G.4	Technical details of the measurement process	105
G.5	Software interface of the drone-based measurement system.....	108
G.6	Considerations for performing RF exposure measurements using drones	108
Annex H (informative) Technical information supporting the case study "Macro BS with massive MIMO product compliance assessment" (Clause 14)		110
H.1	Technical details	110
H.2	Test report	111
Annex I (informative) Technical information supporting the case study "Macro site with massive MIMO product installation compliance assessment" (Clause 15)		112
I.1	Description of the site	112
I.2	Description of the EUT	113
I.3	Evaluation procedure	114
I.4	Calculations	114
I.5	Interpretation of the results	117
I.6	Test report	117

Annex J (informative) Technical information supporting the case study "Small cell products at millimetre-wave frequency using massive MIMO" (Clause 16).....	118
Annex K (informative) Revised flow chart for the simplified RF exposure assessment of BS using parabolic dish antennas (Clause 17)	119
Bibliography.....	121
Figure 1 – Tested local area BS product with two radios denoted RF1 and RF2	20
Figure 2 – Definition of cylindrical RF compliance boundary.....	21
Figure 3 – Small remote radio equipment at 3,5 GHz (EUT antenna)	23
Figure 4 – Simplified process for product installation compliance applicable to small cells.....	25
Figure 5 – Overview of BS installation classes for simplified RF exposure assessment of small cells.....	26
Figure 6 – Illustration of small cells integration in street furniture	28
Figure 7 – Photographs of typical examples of the three small cell site groups	30
Figure 8 – Omni-directional antenna connected to the street cell product.....	32
Figure 9 – Vertical scan lines for spatially averaged field strength measurements.....	33
Figure 10 – View from the measurement location to the BS	35
Figure 11 – Drone used for field measurements around the BS site	38
Figure 12 – Empirical CDFs of transmitted power (normalized) for different environments in 3G network in India [31]	40
Figure 13 – Empirical CDFs of combined transmitted power (normalized) for a 2G/3G/4G network in Sweden [32]	40
Figure 14 – Extrapolation factor of the power flux density $S(r)$ of the different signals and the $S_{\text{total}}(r)$ (all bands) with a sliding time averaging of 6 min applied to the measurements [27]	41
Figure 15 – Generic structure of a base station transmitted RF signal frame.....	44
Figure 16 – Fraction of the total power transmitted in the broadside beam direction for rural and urban scenarios	48
Figure 17 – CDF of the power reduction factor for rural and urban installation scenarios	49
Figure 18 – CDF of the normalized transmitted power for both UMa and UMi.....	51
Figure 19 – Relationship between additional power reduction factor and CDF as a function of number of beams (number of incoherent areas).....	53
Figure 20 – CDF of measurement on 8-cell cluster (experiment #1)	59
Figure 21 – CDF in high-traffic conditions (experiment #5).....	60
Figure 22 – CDF of the reference Beta distribution used to assess power combination factors	63
Figure 23 – CDF resulting from the combination of two independent transmitters having the reference Beta distribution	63
Figure 24 – 5G BS product.....	65
Figure 25 – Box-shaped RF compliance boundary	66
Figure 26 – Outline of the 5G site	69
Figure 27 – Top view of the exclusion zones (red: occupational, yellow: general public)	70
Figure 28 – Side view of the exclusion zones (red: occupational, yellow: general public)	71
Figure 29 – Indoor site with 5G small cell product at millimetre-wave frequency.....	72
Figure 30 – Outdoor site with 5G small cell product at millimetre-wave frequency installed on a 44 m radio tower	74

Figure 31 – Map of the outdoor measurement locations	76
Figure 32 – Outdoor measurement location 1	76
Figure 33 – Outdoor measurement location 2	76
Figure 34 – Typical radio transmitters using parabolic dish antennas	78
Figure 35 – Cylindrical shape RF compliance boundary	79
Figure B.1 – Views of the SAR measurement setup	84
Figure B.2 – Characteristics of SAR of EUT antennas as a function of separation distance at 3,5 GHz	84
Figure C.1 – Example of an E0 installation class configuration	86
Figure C.2 – Example of an E2 installation class configuration	87
Figure C.3 – Example of layout design for an E10 installation class configuration	88
Figure C.4 – Example of layout design for an E100 installation class configuration	90
Figure C.5 – Example of layout design for an E+ installation class configuration	92
Figure D.1 – Mean value of <i>E</i> -field measurements with broadband equipment at intermediate points for each site	94
Figure D.2 – Maximum global <i>E</i> -field values measured in close proximity to the sites	94
Figure D.3 – Consistency analysis between Case A and Case B (without extrapolation) results	95
Figure D.4 – Contribution of mobile services compared to Case B results	95
Figure D.5 – Routes used for walk-tests around each site on both trials	96
Figure D.6 – Cumulative distribution function of the upload throughput on Trial 1 normalized by the maximum value measured on each site when the small cells are off (left) and of the transmitted power by the handset (right)	96
Figure D.7 – Cumulative distribution function of the upload throughput on Trial 2 normalized by the maximum value measured on each site when the small cells are off (left) and of the transmitted power by the handset (right)	97
Figure D.8 – Cumulative distribution functions of the power transmitted by the handset during voice calls on Trial 2 when small cells are on and off	97
Figure D.9 – Results of the measurements around the selected sites	100
Figure D.10 – Comparison between Campaign B results and other countrywide measurement campaigns	100
Figure G.1 – Photograph of test site	105
Figure G.2 – The measurement system	106
Figure G.3 – The route of the drone during the flight	106
Figure G.4 – The drone is hovering at measurement point 1	107
Figure G.5 – The drone is hovering at measurement point 2	107
Figure G.6 – Operating interface of the drone-based measurement system software	108
Figure I.1 – Rooftop scheme	112
Figure I.2 – Geometry of the rooftop installation	113
Figure I.3 – Compliance boundaries for general public (yellow)	115
Figure I.4 – Compliance boundaries for occupational exposure (red)	116
Figure K.1 – Revised flow chart for the simplified assessment of RF compliance boundary in the line of sight of a parabolic dish antenna	120

Table 1 – Outline of RF exposure assessment case studies	19
Table 2 – ICNIRP RF exposure limits relevant for the product compliance assessment (from [8])	20
Table 3 – Dimensions of the cylindrical-shaped RF compliance boundary for general public (GP) and occupational (O) exposure	22
Table 4 – Typical examples of small cell configurations (from [18])	25
Table 5 – General public compliance distances for the street cell BS with omni-directional antenna	33
Table 6 – Street cell EMF compliance assessment comparison: general public (adult) compliance distances based on SAR and field strength	34
Table 7 – Operators and technologies present on the BS site	35
Table 8 – Measurement results for 1,5 m above relative ground level	36
Table 9 – The measurement results of the measurement points	38
Table 10 – Relevant parameters for conducting RF exposure modelling studies of a massive MIMO site or site cluster	46
Table 11 – Relevant parameters for conducting RF exposure assessment of massive MIMO site according to simulation method A (from [33])	47
Table 12 – Relevant parameters for conducting RF exposure assessment of a massive MIMO site or site cluster according to simulation method B (from [35])	50
Table 13 – Summary of the percentiles of the normalized transmitted power and compliance distances for a UMa scenario from 3GPP TR 36.873 [6] and 3GPP TR 38.901 [7]	51
Table 14 – Relevant parameters for conducting RF exposure assessment of massive MIMO site according to simulation method C (from [36])	52
Table 15 – Measurement campaign parameters for conducting RF exposure assessment of a massive MIMO site or site cluster	54
Table 16 – Measurement campaign parameters for RF exposure validation of several massive MIMO sites and site clusters	57
Table 17 – Actual maximum values for experiment #1	59
Table 18 – Actual maximum values for experiment #5	60
Table 19 – Summary of actual maximum power results based on measurements from different sites and clusters	61
Table 20 – Quantiles of the reference Beta distribution used to assess power combination factors	62
Table 21 – Percentiles resulting from the combination of 2 to 5 independent transmitters having the reference Beta distribution	64
Table 22 – Power combination factors applicable to the normalized transmitted power CDF in case of combination of multiple independent identical transmitters	64
Table 23 – Power combination factors applicable to two independent transmitters with a ratio p in amplitude	64
Table 24 – RF EMF exposure limits relevant for the product compliance assessment [8]	66
Table 25 – Dimensions of the box-shaped RF compliance boundary for general public (GP) and occupational (O) exposure for an actual maximum transmitted power configuration	67
Table 26 – RF EMF exposure limits relevant for the compliance assessment	69
Table 27 – Measurement results	75
Table 28 – RF EMF exposure limits relevant for the product compliance assessment (from [8])	78

Table 29 – Examples of radio relay configurations with parabolic dish antennas below 10 GHz	80
Table 30 – Examples of radio relay configurations with parabolic dish antennas above 10 GHz	80
Table A.1 – Technical data for the EUT	82
Table A.2 – EUT configuration with rated maximum transmitted power level and maximum transmitted power levels	82
Table B.1 – Physical parameters	83
Table C.1 – Range of transmitted power classes for 3G and 4G base stations (from 3GPP TS 25.104 [16] and 3GPP TS 36.104 [17])	85
Table C.2 – Example of product parameters for an E0 installation class	85
Table C.3 – Example of product parameters for an E2 installation class	86
Table C.4 – Example of product parameters for an E10 installation class	87
Table C.5 – Example of product parameters for an E100 installation class	89
Table C.6 – Example of product parameters for an E+ installation class	91
Table D.1 – Main characteristics of the two trials of measurement Campaign A	93
Table D.2 – Country and site groups of the sites in measurement Campaign B	98
Table D.3 – The predefined services configured in the measurement equipment	99
Table G.1 – The information of the components in the measurement system	104
Table G.2 – The parameters of the drone	104
Table G.3 – The base station parameters	105
Table G.4 – The measurement steps	105
Table H.1 – Technical data for the EUT	110
Table H.2 – Properties of the antenna used	110
Table H.3 – EUT configuration with rated maximum transmitted power level and actual maximum transmitted power level including a power tolerance of 1 dB	111
Table I.1 – Properties of the installed base stations	113
Table I.2 – RF EMF exposure limits and product installation compliance assessment	117

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CASE STUDIES SUPPORTING IEC 62232 – DETERMINATION OF RF FIELD STRENGTH, POWER DENSITY AND SAR IN THE VICINITY OF RADIOCOMMUNICATION BASE STATIONS FOR THE PURPOSE OF EVALUATING HUMAN EXPOSURE

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IEC TR 62669, which is a Technical Report, has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
106/473/DTR	106/482A/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

When referring to subdivisions of IEC 62232:2017, the number of the subdivision is followed by "(IEC 62232:2017)" in order to differentiate from subdivisions of the current document. For example:

- "defined in 6.4 (IEC 62232:2017)" should be read as "defined in 6.4 of IEC 62232:2017";
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INTRODUCTION

This document contains a series of case studies for the evaluation of electromagnetic (EM) sources transmitting in the frequency range 110 MHz to 100 GHz (including consideration of ambient sources from 100 kHz to 300 GHz) to support the methods specified in IEC 62232:2017.

Case studies presented in this document have been chosen to illustrate typical RF exposure assessments for the most common types of base stations (BS) deployed in mobile and wireless networks, such as small cells, street cells, macro base stations, and parabolic dish antennas used for wireless transmission or mobile backhaul.

The methodologies and approaches described in this document can be useful for the assessment of early 5G products and networks. Clause 13 is dedicated to the introduction, rationale and guiding principles for the implementation of RF exposure assessment using the actual maximum transmitted power or EIRP. While this approach is applicable to any type of BS, it is particularly important for BS using massive MIMO, which are intended to be introduced more predominantly in 5G networks. Multiple examples of case studies with BS using massive MIMO are provided in Clause 13 to Clause 16.

This document is informative. Each use case is described in the main body of the document and includes “lessons learned” and recommendations for improving IEC 62232:2017. More details, rationale and examples of reports are included in annexes.

CASE STUDIES SUPPORTING IEC 62232 – DETERMINATION OF RF FIELD STRENGTH, POWER DENSITY AND SAR IN THE VICINITY OF RADIOCOMMUNICATION BASE STATIONS FOR THE PURPOSE OF EVALUATING HUMAN EXPOSURE

1 Scope

This document, which is a Technical Report, presents a series of case studies in which electromagnetic (EM) fields are evaluated in accordance with IEC 62232:2017. The case studies presented in this document involve intentionally radiating base stations (BS). The BS transmit on one or more antennas using one or more frequencies in the range 110 MHz to 100 GHz and RF exposure assessments take into account the contribution of ambient sources at least in the 100 kHz to 300 GHz frequency range.

Each case study has been chosen to illustrate a typical BS evaluation scenario and employs the methods detailed in IEC 62232:2017. The case studies are provided for guidance only and are not a substitute for a thorough understanding of the requirements of IEC 62232:2017. Based on the lessons learned from each case study, recommendations about RF assessment topics to be considered in the next revision of IEC 62232 are proposed. The methodologies and approaches described in this document are useful for the assessment of early 5G products introduced for consumer trials or deployments.

This document provides background and rationale for applying a compliance approach based on the actual maximum transmitted power or EIRP. Guidance for collecting and analysing information about the transmitted power of a base station and evaluating its actual maximum RF exposure based on modelling studies or measurement studies on operational sites (in networks, sub-networks or field trials) is also presented.

2 Normative references

IEC 62232:2017, *Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure*

IEC 62479, *Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62232:2017 and the following apply.

NOTE The additional terms and definitions given below will be added in the next edition of IEC 62232.

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