

***14TH SYMPOSIUM ON ICT, ENVIRONMENT, CLIMATE CHANGE AND CIRCULAR
ECONOMY:***

***“SUSTAINABLE DIGITAL TRANSFORMATION: THE ROLE OF ICTS AND DIGITAL
TECHNOLOGIES IN ACHIEVING NET ZERO CARBON”***

***THE ROLE OF NATIONAL SYSTEM FOR ENVIRONMENTAL
PROTECTION (SNPA) IN THE ASSESSMENT OF HUMAN EXPOSURE
TO EMF***

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Rome, 25 October 2022

SNPA

The National System for Environmental Protection (SNPA) was established by Law n. 132/2016

SNPA involves 21 Regional (ARPA) and Provincial (APPA) Environmental Agencies and ISPRA

The law assigns to SNPA fundamental tasks such as:

- inspection activity in the field of environmental controls
- monitoring of the state of the environment
- control of sources and pollution factors
- applied research activity
- technical-scientific support to central, regional and local bodies
- collection and dissemination of environmental data

SNPA also expresses its binding opinion on the Government's measures of technical nature on environmental matters

NATIONAL RULES

In Italy, the protection of the population from exposure to electromagnetic fields from 0 Hz to 300 GHz is guaranteed by the Decree 8/7/2003 and by Law no. 221/2012

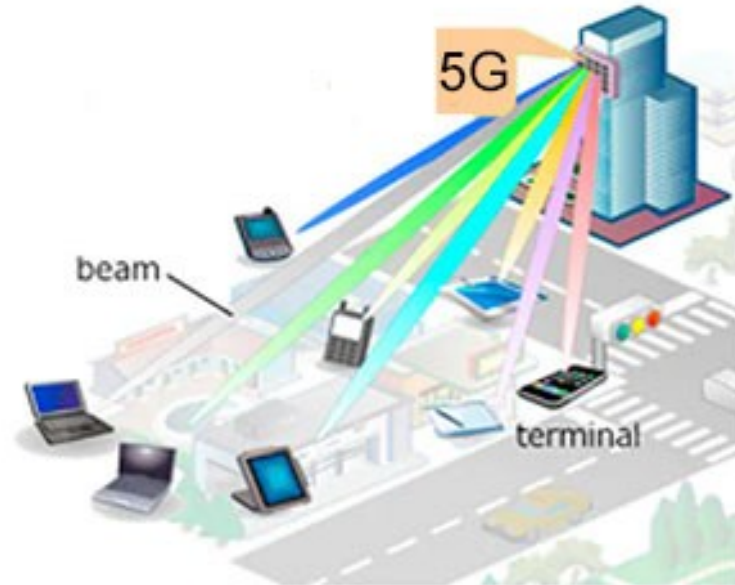
The limit values in Italy are among the most restrictive in Europe (precautionary principle)

Frequenza	R.E. 1999/519/CE (Europa)	Limite di Esposizione (Italia)	Valore di attenzione (Italia)	Obiettivo di qualità (Italia)
694 – 790 MHz	36.2 – 38.6 V/m (Mediato su 6 min)	20 V/m (Mediato su 6 min)	6 V/m (Mediato su 24 h)	6 V/m (Mediato su 24 h)
3.6 – 3.8 GHz	61 V/m (Mediato su 6 min)	40 V/m (Mediato su 6 min)	6 V/m (Mediato su 24 h)	6 V/m (Mediato su 24 h)
26.5 – 27.5 GHz	61 V/m (Mediato su 2.2 min @ 26 GHz)	40 V/m (Mediato su 6 min)	6 V/m (Mediato su 24 h)	6 V/m (Mediato su 24 h)

4G VS. 5G MOBILE SYSTEMS

5G uses "beamforming" antenna systems: directing signals towards the physical location of the terminals

"Adaptive" power emission: based on the number and position of users to be served:



SNPA Council Resolution no. 88/2020

The SNPA Council, with resolution no. 88 of 12 November 2020, approved the technical document "*Criteria for the evaluation of authorization requests to install electronic communication network systems with mMIMO / AASs antennas*"

The document concerns the authorization criteria for mobile telephone systems equipped with innovative technologies – eg. "5G"

SNPA Council Resolution no. 88/2020

The document provides the minimum information that the companies of telecommunication systems for mobile telephony have to provide to the Authority (SNPA)

The document takes into account the Technical Report IEC TR62669:2019 *“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”*

IEC TR62669: 2019 represents the state of the art of experiences conducted at international level in the field of the assessment of exposure due to systems using mMIMO antennas, typically used by 5G technology

SNPA Council Resolution no. 88/2020

Regarding to the comparison with the legislative limit values (averaged over 24-hours), for a transitional period until 6 October 2022 the telephony companies could use a power reduction factor value of 0.31

Table 19 – Summary of actual maximum power results based on measurements from different sites and clusters

Testbed environment	User mobility	Traffic profile	Nb of cells	Measurement period	Power reduction factor using a 100 th percentile approach for the actual maximum power	Power reduction factor using a 95 th percentile approach for the actual maximum power
Urban neighbourhood	High	Low	8	1 month	0,29	0,22
Suburban campus	High	Low	1	1 month	0,27	0,22
Indoor stadium	Low	High	1	1 week	0,27	0,17
Motor circuit	Low	Low	6	3 days	0,26	0,18
Urban festival	Low	Extremely high	1	5 days	0,31	0,26
Suburban train station	High	Low	1	1 day	0,27	0,20

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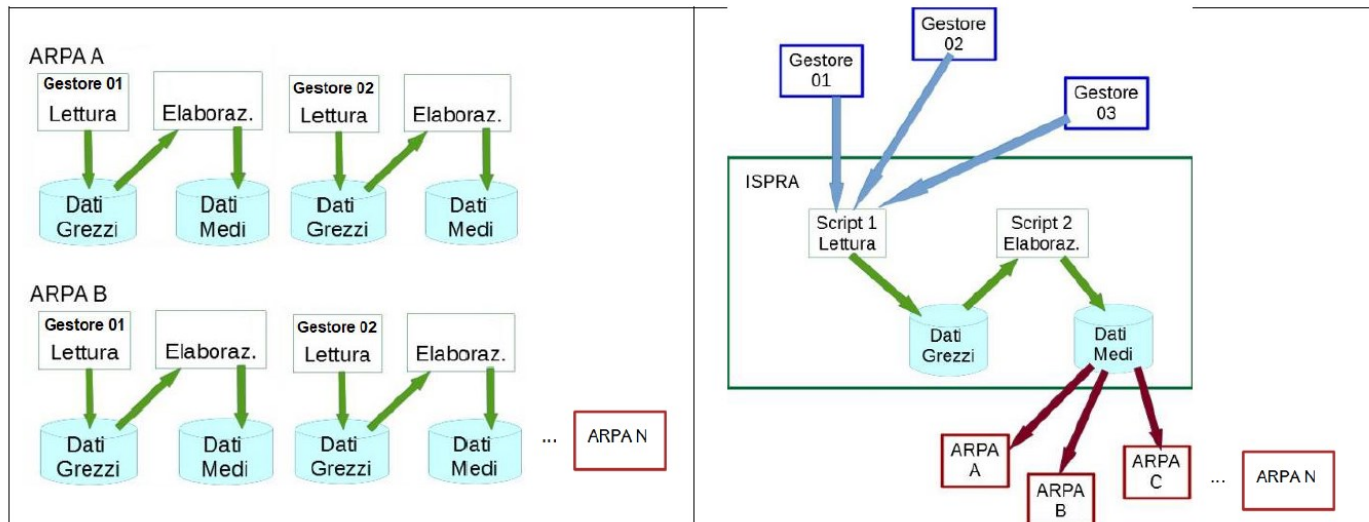
Table 18 – Actual maximum values for experiment #5

	Using the 100 th percentile approach	Using the 95 th percentile approach (for larger sample)
Power reduction factor	0,31	0,26
Actual max EIRP (W) from Equation (3)	4670 W	3920 W
Actual max EIRP (dBm)	66,7 dBm	65,9 dBm
D_f (m) from 6.1 (IEC 62232:2017)	6,1 m	5,6 m
D_s (m) from 6.1 (IEC 62232:2017)	1,7 m	1,6 m

SNPA Council Resolution no. 88/2020

The telephony company has to make available the data for the calculation of the statistical reduction factor over 24 hours, after 6 October 2022

A Working Group SNPA-telephony companies worked on a database for these data



Working Group SNPA – Telephony Companies «Dynamic Spectrum Sharing - DSS»

The DSS system guarantees the simultaneous operation of LTE and 5G networks through the dynamic sharing of the same frequency band and the use of the same network infrastructure.

Measurements made in 4 scenarios

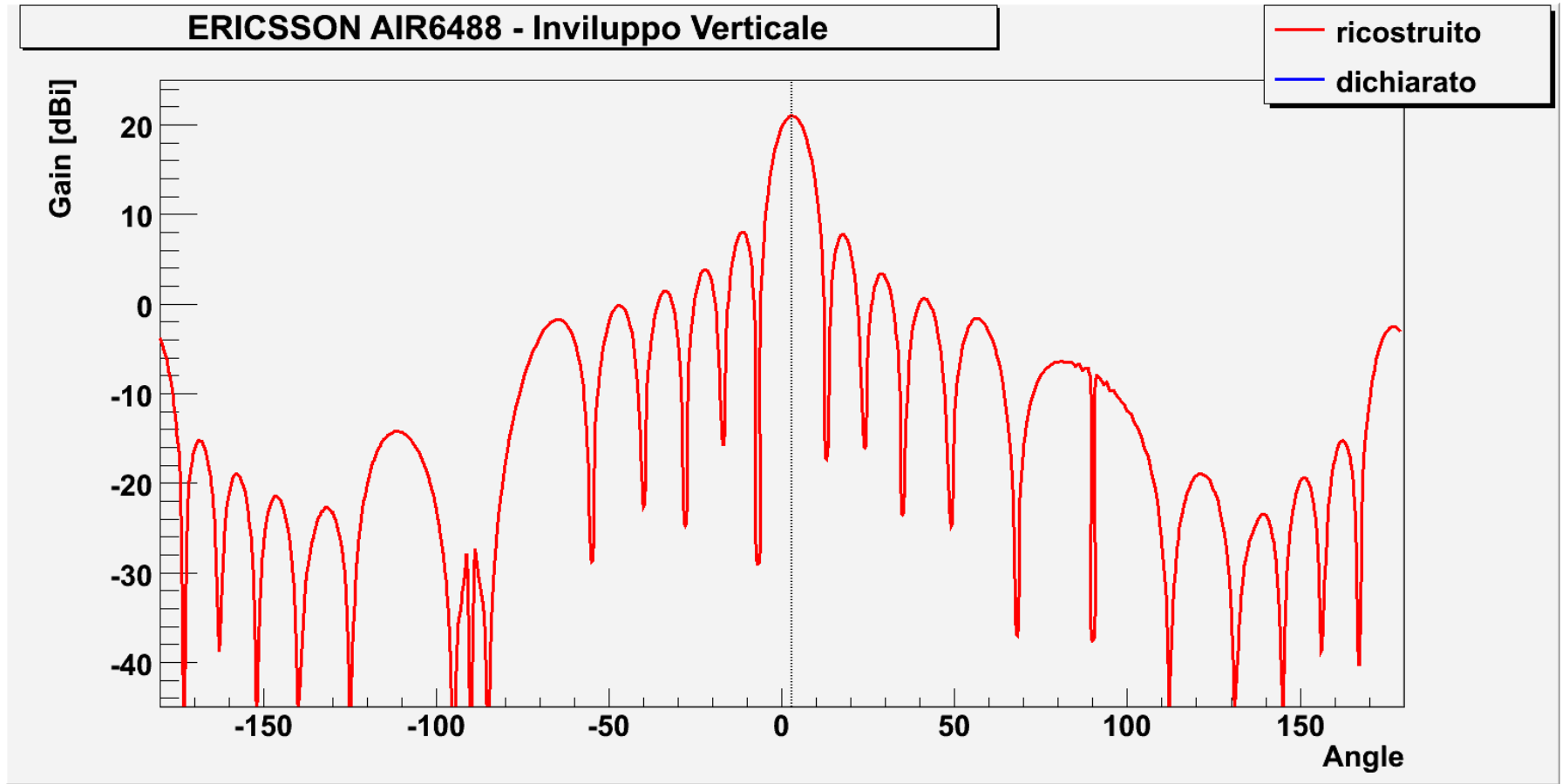
SCENARIO 1 - Legacy LTE, zero traffic

SCENARIO 2 - Legacy LTE, maximum traffic

SCENARIO 3 - DSS active, zero traffic SCENARIO 4 - DSS active, maximum traffic

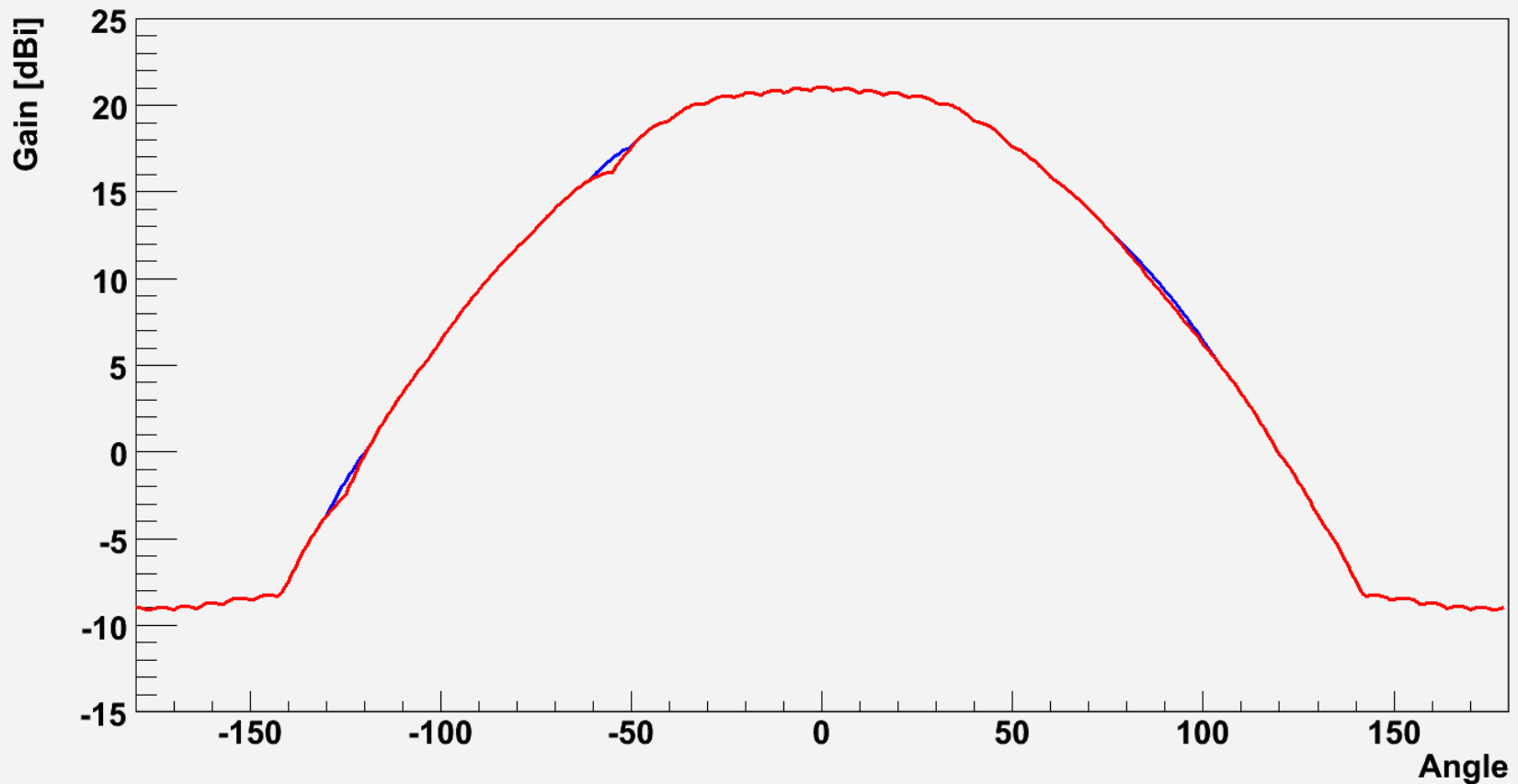
From the results obtained it was possible to verify that the DSS system does not involve an increase in emission levels

Working Group SNPA – Telephony Companies «Envelope diagrams»



Working Group SNPA – Telephony Companies «Envelope diagrams»

ERICSSON AIR6488 - Involuppo Orizzontale



Many thanks for your attention

For more info:

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