HiCellTek

BEREC QoS Compliance Guide

25 KPIs for European Network Operators

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Executive Summary

BEREC (Body of European Regulators for Electronic Communications) defines the quality of service measurement framework that all European network operators must follow. With the **European Electronic Communications Code (EECC)** now fully transposed across EU member states and the **Digital Networks Act (DNA)** entering adoption phase, compliance requirements are evolving rapidly.

The Regulatory Landscape

The EECC (Directive 2018/1972) harmonized QoS transparency and measurement obligations across Europe. BEREC guidelines (BoR (22) 81, BoR (24) 42) provide the operational framework for NRAs to implement consistent measurement methodologies. The upcoming **Digital Networks Act** will further strengthen these requirements with enhanced coverage verification and real-time reporting capabilities.

DNA Adoption Timeline

Phase	Timeline	Key Requirements
Phase 1: Framework	2027 H1	NRA measurement tool certification, baseline KPI definitions
Phase 2: Reporting	2027 H2 – 2028	Mandatory quarterly QoS reports, coverage map validation
Phase 3: Enforcement	2028 – 2029	Automated compliance checks, penalty framework activation

Why Field Measurement Matters

Regulatory compliance cannot rely solely on network-side counters or simulation models. NRAs increasingly require **independent, end-user perspective measurements** collected through certified tools. Drive testing and field measurement provide the ground-truth data that regulators trust for coverage verification, speed compliance checks, and voice quality audits. This guide covers all 25 BEREC-aligned KPIs and maps each to the field measurement methodology and HiCellTek module that enables compliant data collection.

BEREC KPI Reference Table

All 25 BEREC-aligned KPIs organized by category. Thresholds reflect VHCN criteria and typical NRA benchmarks.

Data Quality (5 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
Download Throughput	Data Quality	NRA-defined per contract.	Speed Test
Upload Throughput	Data Quality	NRA-defined per contract. VHCN wireless criterion: >= 50 Mbps UL. Fixed VHCN: >= 200 Mbps.	Speed Test
IP Packet Loss Ratio	Data Quality	VHCN wireless: <= 0.01%. VHCN fixed: <= 0.0025%. Typical NRA target for IAS: < 0.1%.	Network Latency
IP Packet Error Ratio	Data Quality	VHCN wireless: <= 0.01%. VHCN fixed: <= 0.05%.	Network Latency
Web Page Loading Time	Data Quality	NRA-defined.	Speed Test

Latency (3 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
Round-Trip IP Latency (RTT)	Latency	VHCN wireless: <= 25 ms (BoR (20) 165).	Network Latency
IP Packet Delay Variation (Jitter)	Latency	VHCN wireless: <= 6 ms.	Network Latency
DNS Resolution Time	Latency	NRA-defined.	Network Latency

Coverage (5 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
Reference Signal Received Power (RSRP)	Coverage	NRA-defined coverage threshold.	RF Monitor
Reference Signal Received Quality (RSRQ)	Coverage	NRA-defined.	RF Monitor
Signal-to-Interference-plus-Noise Ratio (SINR)	Coverage	NRA-defined.	RF Monitor
SS-RSRP (5G NR Signal Strength)	Coverage	NRA-defined.	RF Monitor
Geographic Coverage (% Territory / Population)	Coverage	NRA-defined per license obligations.	Cartography

Voice Quality (5 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
Voice Call Setup Time	Voice Quality	NRA-defined.	VoLTE QoE
Unsuccessful Call Ratio	Voice Quality	NRA-defined.	VoLTE QoE
Call Drop Rate	Voice Quality	NRA-defined.	VoLTE QoE
Speech Connection Quality (MOS)	Voice Quality	NRA-defined.	VoLTE QoE
VoLTE Call Setup Delay (SIP-level)	Voice Quality	NRA-defined.	VoLTE QoE

Availability (5 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
IAS Service Availability	Availability	VHCN criterion (fixed and wireless): >= 99.	Network Latency

KPI Name	Category	Threshold	HiCellTek Module
RRC Connection Setup Success Rate	Availability	NRA-defined.	L3 Decoder
E-RAB / DRB Setup Success Rate	Availability	NRA-defined.	L3 Decoder
Inter-cell Handover Success Rate	Availability	NRA-defined.	L3 Decoder
Network Attach Success Rate	Availability	NRA-defined.	L3 Decoder

Transparency (2 KPIs)

KPI Name	Category	Threshold	HiCellTek Module
Normally Available Download Speed	Transparency	Must be specified in contract.	Speed Test
Minimum Contractual Speed (Fixed IAS)	Transparency	ISP-defined in contract.	Speed Test

Measurement Methodology Comparison

Choosing the right measurement approach is critical for regulatory acceptance. This comparison covers the three primary methodologies used in European QoS assessment.

Criteria	Crowdsourced	Hardware Probes	Drive Test
Cost	Low (end-user devices)	High (dedicated HW deploy)	Medium (mobile equip + team)
Accuracy	Variable (uncontrolled)	High (fixed, calibrated)	Very High (controlled, repeatable)
Coverage	Wide (wherever users go)	Limited (fixed locations)	Targeted (routes on demand)
Regulatory Acceptance	Supplementary only	Accepted (fixed IAS)	Gold Standard (mobile QoS)
Real-time Capability	Near real-time (app-based)	Continuous monitoring	Real-time during campaign
KPI Coverage	Speed, latency (limited)	Data quality, latency	All 25 BEREC KPIs
Reproducibility	Low (variable conditions)	High (same location)	High (defined routes)

RECOMMENDATION: Drive testing remains the gold standard for mobile network QoS assessment under BEREC guidelines. It is the only methodology that captures all 25 KPIs including RF coverage, L3 signalling, voice quality (POLQA MOS), and geo-referenced data in a single campaign. NRAs across Europe (ARCEP, BNetzA, AGCOM) mandate drive test data for coverage verification audits.

Country-Specific Compliance Checklist

Each EU member state adapts BEREC guidelines through its National Regulatory Authority (NRA). Below are key requirements from five major European regulators.

France — ARCEP
• Annual mobile QoS campaign (Mon Reseau Mobile): voice, data, web browsing
• Drive test mandatory on roads, rail, tourist areas
• Crowdsourced data accepted as supplementary only
• Publication of comparative operator results
HiCellTek Modules: Drive Test, Speed Test, VoLTE QoE, Cartography

Germany — BNetzA
• Breitbandmessung certified speed test for fixed IAS
• Mobile coverage obligations tied to 5G spectrum licenses
• Quarterly reporting on coverage expansion milestones
• Penalty framework for unmet coverage targets
HiCellTek Modules: Speed Test, RF Monitor, Drive Test, Cartography

United Kingdom — Ofcom
• Connected Nations annual report: indoor/outdoor coverage data
• Operators must provide coverage checker tools to consumers
• Emergency services coverage requirements (ESN)
• Shared Rural Network compliance verification
HiCellTek Modules: RF Monitor, Drive Test, Cartography, Speed Test

Italy — AGCOM
• Misurainternet certified speed measurement for fixed IAS
• Annual mobile QoS monitoring via drive test campaigns
• Voice quality (MOS) reporting required for mobile operators
• Geographic coverage data submission per municipality
HiCellTek Modules: Speed Test, VoLTE QoE, Drive Test, Cartography

Spain — CNMC
• Annual broadband quality report with speed benchmarks
• Coverage obligations for 700 MHz 5G spectrum
• NRA-administered speed test for consumer verification
• Operator transparency on advertised vs. delivered speeds
HiCellTek Modules: Speed Test, RF Monitor, Drive Test, L3 Decoder

HiCellTek Module Mapping

Each HiCellTek module maps directly to BEREC KPI categories, enabling complete compliance coverage from a single Android-based diagnostic suite.

Module	KPIs Covered	#	Export Formats
RF Monitor	RSRP, RSRQ, SINR, SS-RSRP	4	Excel, CSV, HLOG, QMDL
Speed Test	DL/UL Throughput, Normally Available Speed, Min Speed, Web Load Time	5	Excel, CSV, HLOG
VoLTE QoE	Call Setup Time, Unsuccessful Call Ratio, Call Drop Rate, MOS, VoLTE Delay	5	Excel, CSV, HLOG
Network Latency	RTT, Jitter, Packet Loss, Packet Error, DNS Resolution, Availability	6	Excel, CSV, HLOG
Drive Test	All 25 KPIs (orchestrates other modules with GPS correlation)	25	Excel, CSV, HLOG, QMDL
L3 Decoder	RRC Setup, E-RAB/DRB Setup, Handover, Attach Success Rate	4	Excel, CSV, HLOG, QMDL
Cartography	Geographic Coverage (% Territory/Population)	1	Excel, CSV, KML

Module Details

RF Monitor: Real-time RF signal measurement for 2G/3G/4G/5G. Captures UE-reported and network-side parameters.

Speed Test: RFC 6349-aligned throughput testing with multi-server support and contractual speed verification.

VoLTE QoE: End-to-end voice quality assessment with POLQA MOS scoring and SIP signalling analysis.

Network Latency: Comprehensive latency and packet-level metrics with loaded/unloaded condition testing.

Drive Test: Geo-referenced campaign mode integrating all modules for regulatory-grade field data.

L3 Decoder: Layer 3 signalling decode for RRC, NAS, and SIP messages with 3GPP-compliant analysis.

Cartography: Coverage mapping with multi-layer visualization and grid-tile compliance assessment.

Ready to demonstrate BEREC compliance?

Get field-ready in days, not months.
One Android device, 25 KPIs.

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