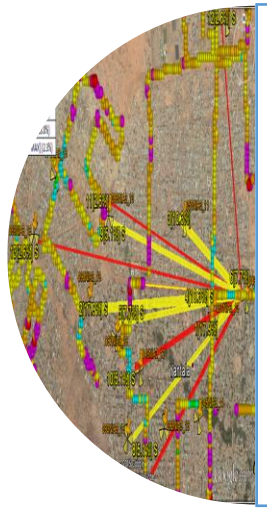
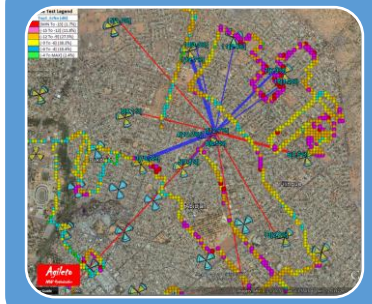


MOBILE RADIO NETWORK OPTIMIZATION



PoC (Proof of Concept)
Audit & Optimization

Agileto
Mobile NW Optimization
PRO EDITION

Agileto
NW Optimisation

PoC (Proof of Concept) - Audit and Optimization

- **AUDIT**

This report will include an audit of the main RF parameters on the Mobile Network based on the snapshot file(s) extracted from the real network. The following basic outputs are provided:

1) Mapping of the Mobile Network (Sites + Cells + Neighbors) into MapInfo + Google Earth
2) Summary + detailed Cell's main RF Parameters + Neighbors declarations (reciprocity, distance, etc)
3) Inconsistency cells declarations detected (discrepancies)
4) Comparison between the existing Neighbors declarations and ANR proposed by Agileto (tables and maps)
5) BCCH/PSC/PCI conflict detections (tables + maps) + recommendation proposals

- **OPTIMISATION**

This report will include the results based on the basic drive tests (+ OSS KPIs / counters / call trace up to the options provided by each vendor). The following basic outputs are provided:

1) Drive Test route + Coverage & Quality (Top1 to TopX best servers detected) with mapping in into MapInfo + Google Earth
2) Neighbors analysis (Detected / Missing / Redundant) + HO traffic flow weight (tables and maps)
3) Over-shooters + Polluted areas
4) Cell's Coverage efficiency (Top1 / ASet / Full)
5) BCCH/PSC/PCI conflict detections (tables + maps) + recommendation proposals
6) Automatic Cross feeder/sector detections (tables + maps)
7) (Re)play mobile links to cells in ASet (3dB below Top1) along the Drive Test route (Google Earth)

Notice: ***This PoC process is similar for all technologies (2G/3G/4G/5G)*** although this presentation may use as example data occasionally from a specific technology.

Agenda

- Introduction: Context, Inputs and Deliverables
- Geo-spatial representation of the Network/Cluster
- Cluster Audit & Sanity Check (RF main param + Neighbors + Discrepancy)
- Automatic best Neighboring evaluation (missing detected)
- Drive Test (DT) Analysis and Optimization

Inputs and deliverable

Inputs:

- Geodatabase of network encompassing the cluster under study:
  - Sites/Cells Coordinates in WGS 84 in CSV or tabular format
  - Antenna configurations per technology (2G, 3G, 4G & 5G) : height, azimuth, tilt (mech + elec)…
- RNC configurations of the 3G cluster: Ericsson 3G *.xml dump OSS file(s) on 01.11.202X
- BSC dump of the 2G cluster: Ericsson 2G *.log dump OSS file(s) on 01.11.202X
- Drive test log files (POST-Swap) on time period from 27.10.202X to 28.10.202X (Scanner 3G)

Outputs:

- GIS representation of the 2G, 3G, 4G & 5G clusters in MapInfo & Google earth formats
- Cluster Audit & Sanity check (main RF parameters + neighbors + discrepancies)
- Automatic best neighboring evaluation (based only on Cells positions Lat/Long + azimuths)
- Drive Test route analysis, optimization & presentations in MapInfo & Google earth formats
- Recommendations:
  - Neighbors proposals (missing + detected)
  - Over-shooters detections
  - Polluted areas (Investigations)
  - Cells Coverage efficiency
  - PSC audit and optimization
  - Automatic Cross Feeders/Sectors detections

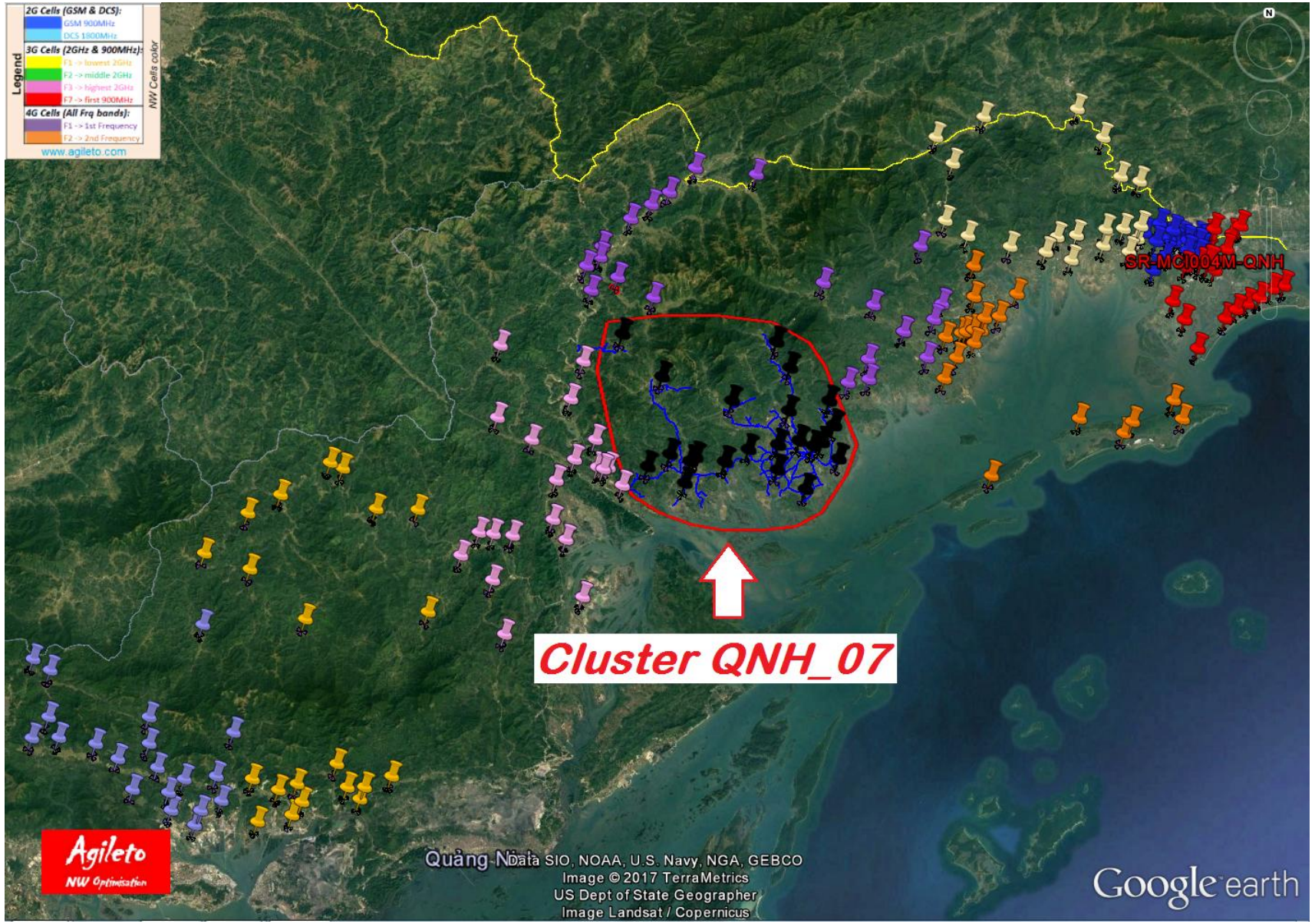
Agenda

- Introduction: Context, Inputs and Deliverables
- Geo-spatial representation of the Network/Cluster
- Cluster Audit & Sanity Check (RF main param + Neighbors + Discrepancy)
- Automatic best Neighboring evaluation (missing detected)
- Drive Test (DT) Analysis and Optimization

Geographical cluster distribution

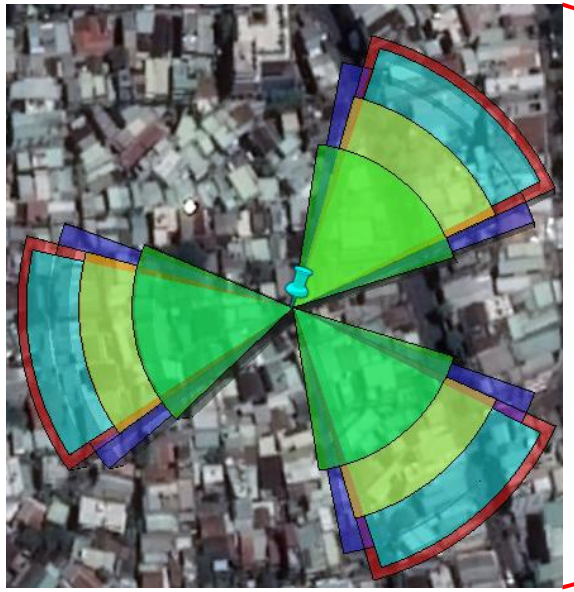
Cluster QNH_07

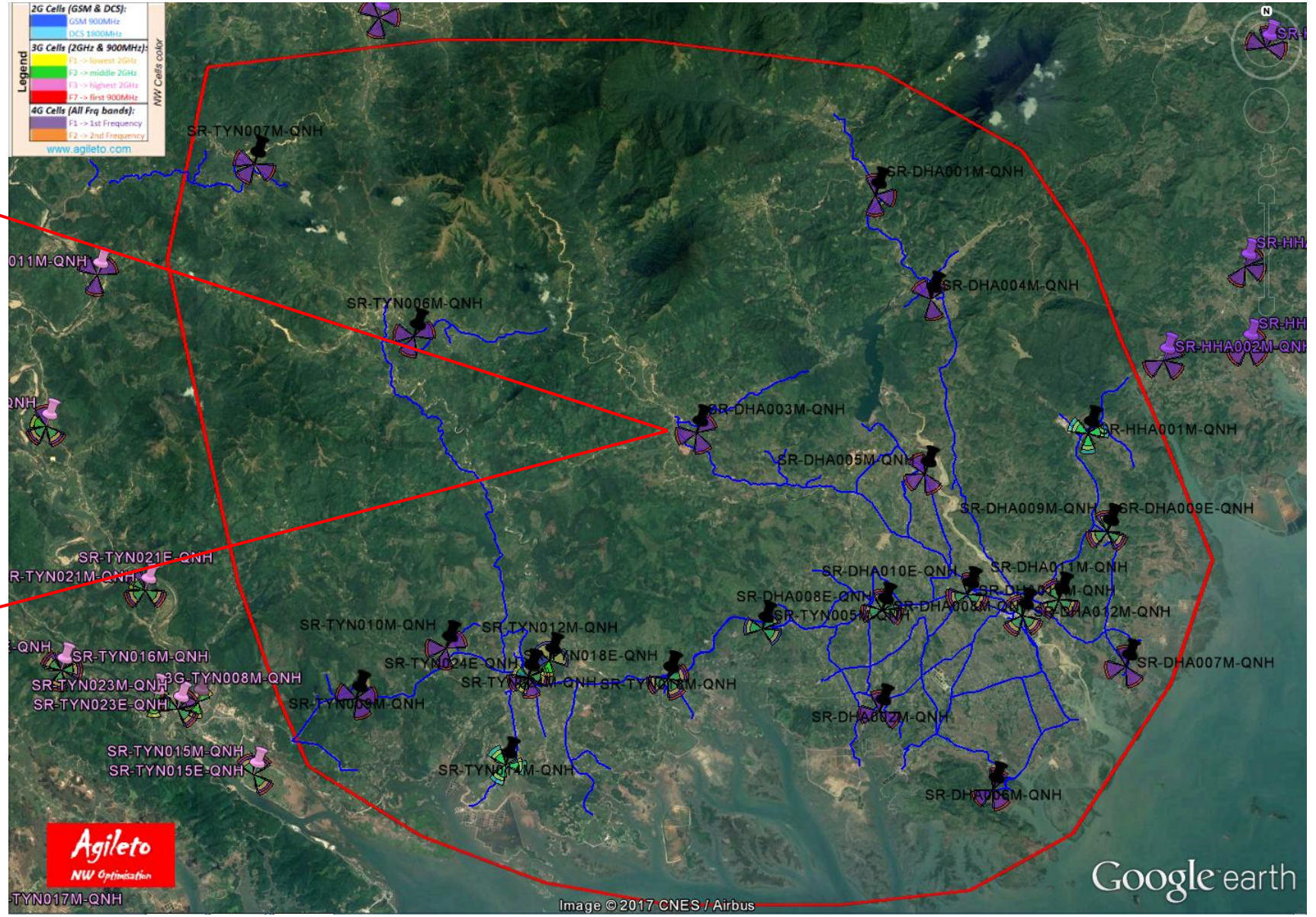
General Overview



Geographical cluster distribution

- Geographical distribution of the 2G, 3G cells related to the cluster





Layers color Legend:

3G: **F1**, **F2** (2100MHz)

3G: **F7** (900MHz)

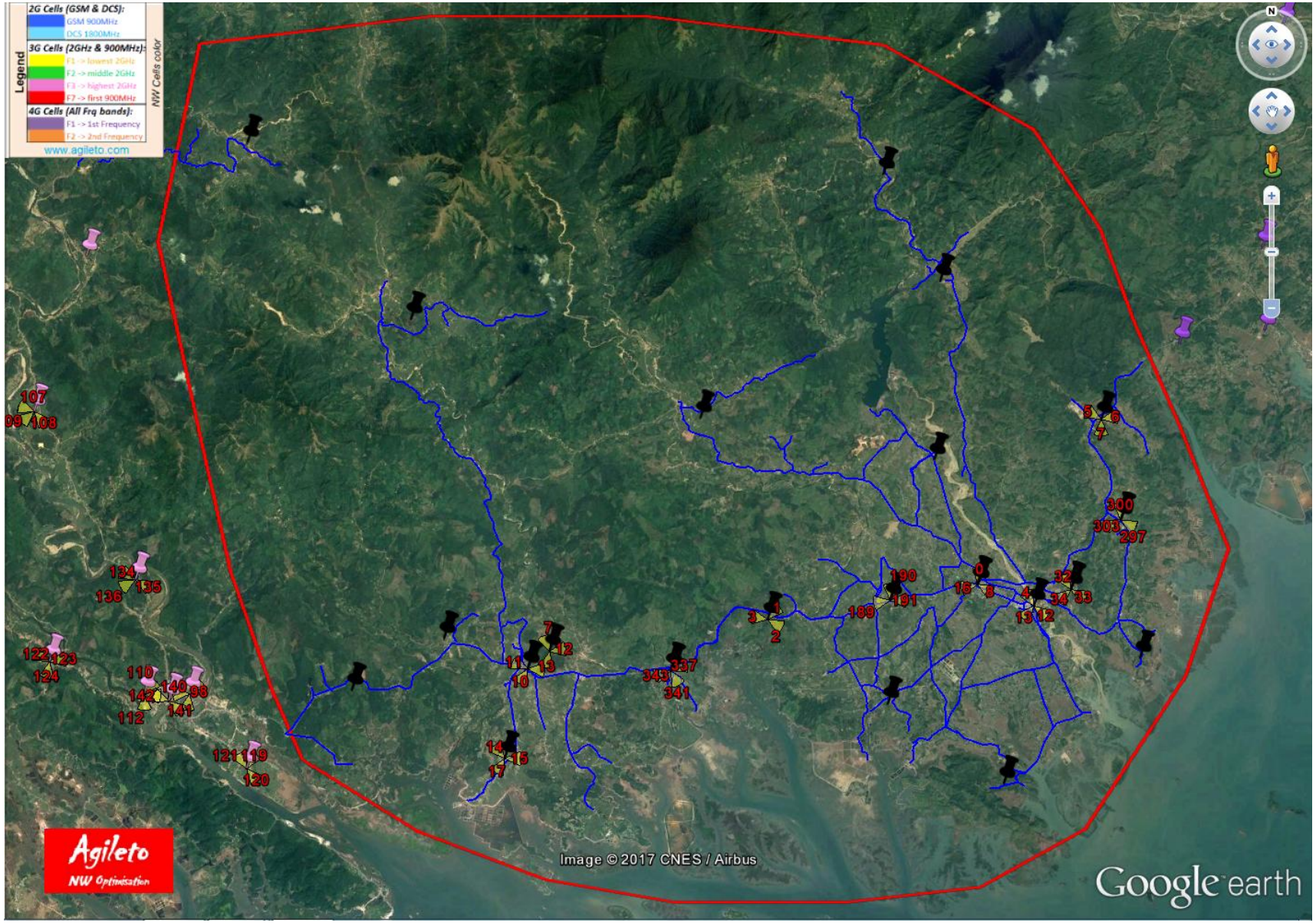
2G: **900**, **1800**

3G Geographical cluster distribution, (Layer F1)

➢ Cells/Sites distribution of the DT cluster under study:

- Nbr of 2G sites: 22
- Nbr of 3G sites: 22
- Nbr of cells per band:
  - 2G-900 = 60
  - 2G-1800 = 6
  - 3G-F1 = 33
  - 3G-F2 = 33
  - 3G-F7 = 54

NB:
For this entire report, only the 3G cells related to the cluster layer F1 2100MHz band (UARFCN = 10788) will be considered!



Agenda

- Introduction: Context, Inputs and Deliverables
- Geo-spatial representation of the Network/Cluster
- Cluster Audit & Sanity Check (RF main param + Neighbors + Discrepancy)
- Automatic best Neighboring evaluation (missing detected)
- Drive Test (DT) Analysis and Optimization

Cluster Audit & Sanity check (summary)

Below is presented a sample concerning the first **cells** from the Audit & Sanity check summary analysis for the cluster under investigation. The main RF parameters analysis and the related summary neighbors are presented accordingly. The entire table is attached to this report.

Cell_Code	RNC	Cluster	NodeB Name	FddCell Name	LCell_ID	LAC	Frequency	MaxTx Power	pCPICH Power	SectorID [Azimuth] (BtsAnt)	PSC	Same PSC MinDist (LCell_ID)	Same PSC MinDist [Km]	Same PSC MinDist (InsideBW)	DistMin to all other Cells InsideBW [Km]
W130112491_11	RN1301E	Cluster_QNH_07	SR-DHA008E-QNH	3G-DHA008M11-QNH	130112491	13019	10788	43	33	Issue? 1 [0] (0)	190	130112883	34.3	False/False	26.7
W130112492_21	RN1301E	Cluster_QNH_07	SR-DHA008E-QNH	3G-DHA008M12-QNH	130112492	13019	10788	43	33	Issue? 2 [90] (0)	191	130112881	34.3	False/False	2.1
W130112493_31	RN1301E	Cluster_QNH_07	SR-DHA008E-QNH	3G-DHA008M13-QNH	130112493	13019	10788	43	33	Issue? 3 [260] (0)	189	130112882	34.3	False/False	3
W130112521_11	RN1301E	Cluster_QNH_07	SR-DHA009E-QNH	3G-DHA009M11-QNH	130112521	13019	10788	43	33	Issue? 1 [0] (0)	300	335712331	590.3	False/True	2.4
W130112522_21	RN1301E	Cluster_QNH_07	SR-DHA009E-QNH	3G-DHA009M12-QNH	130112522	13019	10788	43	33	Issue? 2 [120] (0)	297	335810211	599.1	False/True	24.2
W130112523_31	RN1301E	Cluster_QNH_07	SR-DHA009E-QNH	3G-DHA009M13-QNH	130112523	13019	10788	43	33	Issue? 3 [245] (0)	303	335811541	592.9	False/False	2
W130112801_11	RN1301E	Cluster_QNH_07	SR-DHA010E-QNH	3G-DHA010M11-QNH	130112801	13019	10788	43	34.7	Issue? 1 [10] (0)	0	335813771	583.9	False/True	4.9
W130112802_21	RN1301E	Cluster_QNH_07	SR-DHA010E-QNH	3G-DHA010M12-QNH	130112802	13019	10788	43	34.7	Issue? 2 [120] (0)	8	130110123	31.3	False/True	1.4
W130112803_31	RN1301E	Cluster_QNH_07	SR-DHA010E-QNH	3G-DHA010M13-QNH	130112803	13019	10788	43	34.7	Issue? 3 [255] (0)	16	130112821	37.2	False/False	2.1

Cell_Code	RNC	FddCell Name	DistMax Neigh IntraFreq [Km]	NrNeigh IntraFreq	sib11and Dch IntraFreq	Reciprocally Neigh IntraFreq	Non Reciprocally Missing Incoming IntraFre	Non Reciprocally Missing Outgoing IntraFre	DistMax Neigh InterFreq [Km]	NrNeigh InterFreq	sib11and Dch InterFreq	Reciprocally Neigh InterFreq	Non Reciprocally Missing Incoming InterFre	Non Reciprocally Missing Outgoing InterFre	DistMax Neigh 2G [Km]	NrNeigh 2G	sib11and Dch 2G	DistMax Neigh Total [Km]	NrNeigh Total	sib11and Dch Total
W130112491_11	RN1301E	3G-DHA008M11-QNH	6.6	16	16	16	0	0	7.7	26	26	25	1	0	7.7	31	31	7.7	73	73
W130112492_21	RN1301E	3G-DHA008M12-QNH	6.6	18	18	18	0	0	7.7	29	29	29	0	0	7.7	28	28	7.7	75	75
W130112493_31	RN1301E	3G-DHA008M13-QNH	8.8	17	17	17	0	0	8.8	26	26	26	0	0	8.8	28	28	8.8	71	71
W130112521_11	RN1301E	3G-DHA009M11-QNH	3.7	11	11	10	1	0	11.8	26	26	18	8	0	10	27	27	11.8	64	64
W130112522_21	RN1301E	3G-DHA009M12-QNH	24.2	12	12	12	0	0	16.3	27	27	19	8	0	16.3	25	25	24.2	64	64
W130112523_31	RN1301E	3G-DHA009M13-QNH	8.8	18	18	18	0	0	7.1	29	29	24	5	0	6.9	27	27	8.8	74	74
W130112801_11	RN1301E	3G-DHA010M11-QNH	5.1	19	19	19	0	0	7.7	29	29	27	2	0	7.3	29	29	7.7	77	77
W130112802_21	RN1301E	3G-DHA010M12-QNH	5.1	17	17	17	0	0	7.7	29	29	28	1	0	7.3	29	29	7.7	75	75
W130112803_31	RN1301E	3G-DHA010M13-QNH	7.6	18	18	18	0	0	7.7	29	29	29	0	0	7.6	28	28	7.7	75	75

Cluster Audit & Sanity check (3G3G neighbors)

Below is presented a sample concerning the first **3G3G neighbors** (Source-Target) extracted from the Audit & Sanity check analysis for the cluster under investigation. The main related summary neighbors are presented accordingly. The entire table is attached to this report.

RNC_Source	RNC_Target	sib11OrDchUsage	Cluster S	Cell Name S	sourceCID	CID S	PSC S	RNC Name S	Frequency S	Cluster T	Cell Name T	targetCID	CID T	PSC T	RNC Name T	Frequency T	Reverse Position	Neigh Dist [Km]
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA002M41-QNH	130142561	42561	276	RN1301E	3003	2562	2.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA002M42-QNH	130142562	42562	278	RN1301E	3003	2608	2.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA002M43-QNH	130142563	42563	273	RN1301E	3003	2649	2.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA003M41-QNH	130140441	40441	201	RN1301E	3003	2694	6.3
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA003M42-QNH	130140442	40442	202	RN1301E	3003	2747	6.3
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA003M43-QNH	130140443	40443	204	RN1301E	3003	2791	6.3
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA004M42-QNH	130140482	40482	363	RN1301E	3003	2875	7.7
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA005M41-QNH	130142721	42721	251	RN1301E	3003	2945	3.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA005M42-QNH	130142722	42722	249	RN1301E	3003	3003	3.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA005M43-QNH	130142723	42723	255	RN1301E	3003	3051	3.5
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA006M41-QNH	130142761	42761	396	RN1301E	3003	3094	5.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA007M43-QNH	130142893	42893	383	RN1301E	3003	3327	6.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA008M12-QNH	130112492	12492	191	RN1301E	10788	3429	0
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA008M13-QNH	130112493	12493	189	RN1301E	10788	3475	0
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA008M41-QNH	130142491	42491	190	RN1301E	3003	3638	0
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA008M42-QNH	130142492	42492	191	RN1301E	3003	3689	0
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA008M43-QNH	130142493	42493	189	RN1301E	3003	3740	0
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA009M13-QNH	130112523	12523	303	RN1301E	10788	3861	5.8
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA009M41-QNH	130142521	42521	300	RN1301E	3003	4026	5.8
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA009M43-QNH	130142523	42523	303	RN1301E	3003	4136	5.8
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M11-QNH	130112801	12801	0	RN1301E	10788	4189	2.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M12-QNH	130112802	12802	8	RN1301E	10788	4238	2.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M13-QNH	130112803	12803	16	RN1301E	10788	4284	2.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M41-QNH	130142801	42801	0	RN1301E	3003	4466	2.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M42-QNH	130142802	42802	8	RN1301E	3003	4518	2.1
1301	1301	sib11AndDch	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	Cluster_QNH_07	3G-DHA010M43-QNH	130142803	42803	16	RN1301E	3003	4576	2.1

Cluster Audit & Sanity check (3G2G neighbors)

Below is presented a sample concerning the first **3G2G neighbors** (Source-Target) extracted from the Audit & Sanity check analysis for the cluster under investigation. The main related summary neighbors are presented accordingly. The entire table is attached to this report.

Cell_Source	Cell_Target	RNC_Source	Cluster S	Cell Name S	sourceCID	CID S	PSC S	RNC Name S	Frequency S	Cell Name T	targetCID	target LAC	sib11OrDchUsage	Neigh Dist [Km]
W130112491_11	G13511.12561_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0021|QDH0021	12561	13511	sib11AndDch	2.5
W130112491_11	G13511.12562_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0022|QDH0022	12562	13511	sib11AndDch	2.5
W130112491_11	G13511.10441_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0031|QDH0031	10441	13511	sib11AndDch	6.3
W130112491_11	G13511.10442_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0032|QDH0032	10442	13511	sib11AndDch	6.3
W130112491_11	G13511.10443_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0033|QDH0033	10443	13511	sib11AndDch	6.3
W130112491_11	G13511.10481_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0041|QDH0041	10481	13511	sib11AndDch	7.7
W130112491_11	G13511.10482_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0042|QDH0042	10482	13511	sib11AndDch	7.7
W130112491_11	G13511.10483_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0043|QDH0043	10483	13511	sib11AndDch	7.7
W130112491_11	G13511.12721_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0051|QDH0051	12721	13511	sib11AndDch	3.5
W130112491_11	G13511.12722_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0052|QDH0052	12722	13511	sib11AndDch	3.5
W130112491_11	G13511.12723_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0053|QDH0053	12723	13511	sib11AndDch	3.5
W130112491_11	G13511.12761_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0061|QDH0061	12761	13511	sib11AndDch	5.1
W130112491_11	G13511.12893_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0073|QDH0073	12893	13511	sib11AndDch	6.1
W130112491_11	G13511.12491_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0081|QDH0081	12491	13511	sib11AndDch	0
W130112491_11	G13511.12492_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0082|QDH0082	12492	13511	sib11AndDch	0
W130112491_11	G13511.12493_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0083|QDH0083	12493	13511	sib11AndDch	0
W130112491_11	G13511.12521_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0091|QDH0091	12521	13511	sib11AndDch	5.8
W130112491_11	G13511.12522_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0092|QDH0092	12522	13511	sib11AndDch	5.8
W130112491_11	G13511.12523_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0093|QDH0093	12523	13511	sib11AndDch	5.8
W130112491_11	G13511.12801_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0101|QDH0101	12801	13511	sib11AndDch	2.1
W130112491_11	G13511.12802_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0102|QDH0102	12802	13511	sib11AndDch	2.1
W130112491_11	G13511.12803_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0103|QDH0103	12803	13511	sib11AndDch	2.1
W130112491_11	G13511.12921_1	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0111|QDH0111	12921	13511	sib11AndDch	4.3
W130112491_11	G13511.12922_2	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0112|QDH0112	12922	13511	sib11AndDch	4.3
W130112491_11	G13511.12923_3	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QDH0113|QDH0113	12923	13511	sib11AndDch	4.3
W130112491_11	D13511.60771_4	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QHH0014|QHH0014	60771	13511	sib11AndDch	6.6
W130112491_11	D13511.60773_6	1301	Cluster_QNH_07	3G-DHA008M11-QNH	130112491	12491	190	RN1301E	10788	QHH0016|QHH0016	60773	13511	sib11AndDch	6.6

Cluster Audit & Sanity check (discrepancies)

4G Technology:
Example of 3G discrepancy declarations

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	eNodeBName Ref	eNodeBId Ref	3G RncId	3G CId	3G CName	3G PSC	3G LAC	3G UArfcn		3G CName OMC4G	3G PSC OMC4G	3G LAC OMC4G	3G UArfcn OMC4G
6155	RAB502_L	100502	860	6077	RA025W	23	41000	10762		RA025W	290	31900	10762
6156	RAB502_L	100502	860	30941	RAB094V	207	41000	10762		RAB094V	337	50200	10762
6157	RAB502_L	100502	860	31010	RAB101U	400	41000	10762		RAB101U	153	50200	10762
6158	RAB502_L	100502	860	31011	RAB101V	408	41000	10762		RAB101V	161	51200	10762
6162	RAB900_L	100900	860	6043	RA014V	128	41000	10762		RA014V	492	31700	10762
6163	RAB900_L	100900	860	39002	RAB900W	250	41000	10762		RAB900W	44	50000	10762
6164	RAB900_L	100900	860	6044	RA014W	136	41000	10762		RA014W	500	31700	10762
6168	RAB909_L	100909	860	31011	RAB101V	408	41000	10762		RAB101V	161	51200	10762

3G Cells declarations @ OMC_4G @ eNodeB level

3G Cells declarations @ OMC_3G

3G Cells declarations @ OMC_4G in discrepancy

Agenda

- Introduction: Context, Inputs and Deliverables
- Geo-spatial representation of the Network/Cluster
- Cluster Audit & Sanity Check (RF main param + Neighbors)
- Automatic best Neighboring evaluation (missing detected)
- Drive Test (DT) Analysis and Recommendations

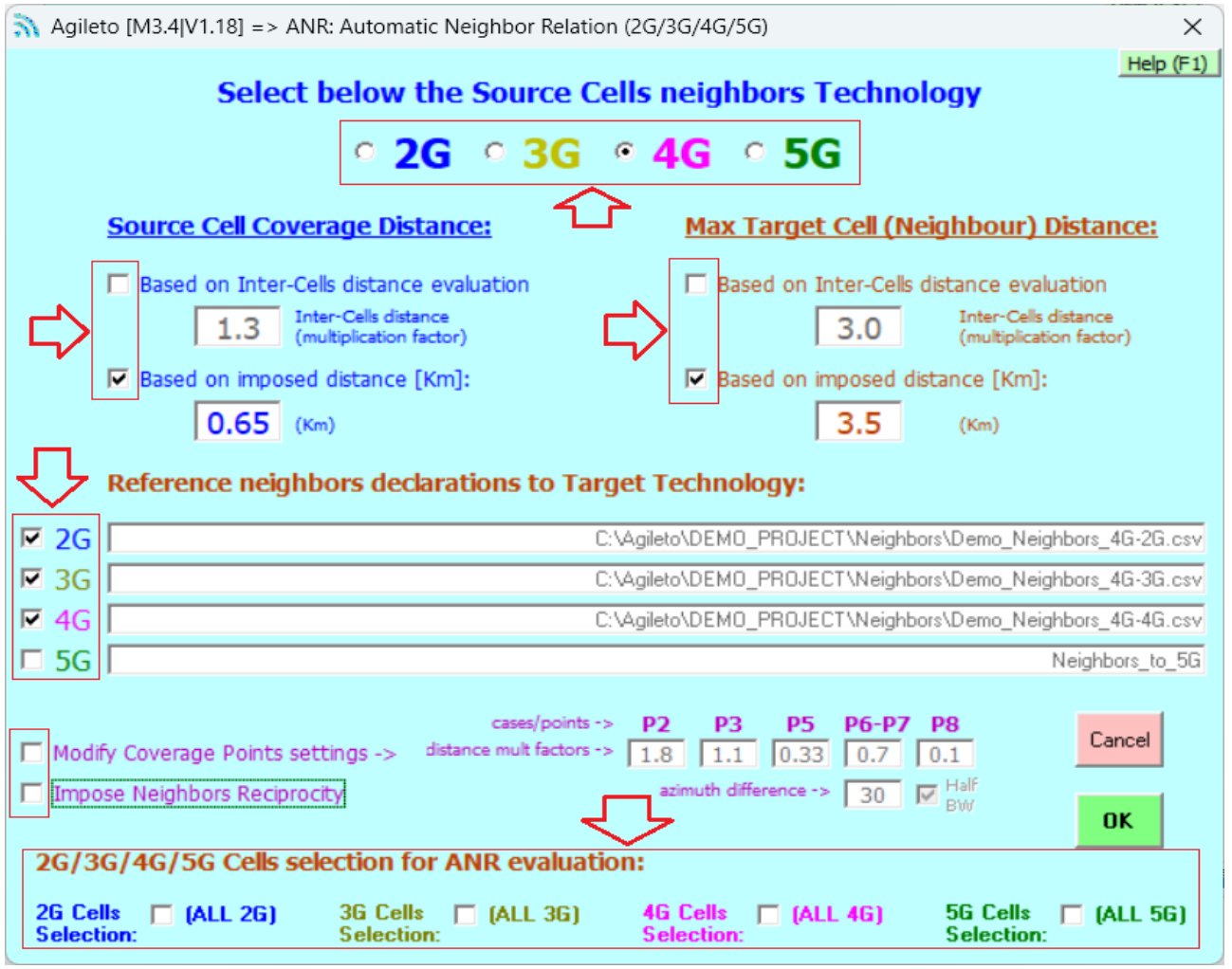
Automatic best Neighboring evaluation

Agileto dedicated module (M3.4) provides the optimum neighbors generation based only on the Cells positions (Latitude and Longitude) + their antennas orientations (Azimuths) together with the Source Coverage + Target Distance (see below).

- Evaluating the cluster average Inter-Cells distance ~ 3Km, the following inputs were used:

  - Source Cell Coverage Distance:
    4Km
  - Target Cell (Neighbor) Distance (maximum):
    8Km

- By using as reference the existing **3G3G + 3G2G neighbors** declarations extracted from the OMC 3G export snapshot file, the missing neighbors detected by this method will be presented in tabular format and Google Earth representation on this section.



Automatic best Neighboring evaluation (3G3G missing)

Below is presented a sample representing the first missing **3G3G neighbors** (Source-Target) detected by Agileto module M3.4 for the cluster under investigation. The entire table containing a number of 9 **IntraFrq** + 259 **InterFrq** missing neighbors detected is attached to this report.

Cell_Name S	Cell_Name T	RncId S	CellId S	RncId T	CellId T	Dist [Km]	Neighbor case	Neighbor Diff	FrqLayer S	FrqLayer T	Cluster S	Cluster T
3G-DHA010M11-QNH	3G-DHA010M21-QNH	1301	12801	1301	22801	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-DHA010M22-QNH	1301	12801	1301	22802	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-DHA010M23-QNH	1301	12801	1301	22803	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-DHA011M21-QNH	1301	12801	1301	22921	2.2	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-TYN018M11-QNH	1301	12801	1301	12471	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-TYN018M21-QNH	1301	12801	1301	22471	7.6	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-TYN018M41-QNH	1301	12801	1301	42471	7.6	4	1	1	7	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-HHA002M43-QNH	1301	12801	1301	42283	7.5	4	1	1	7	Cluster_QNH_07	Cluster_QNH_08
3G-DHA010M11-QNH	3G-HHA001M21-QNH	1301	12801	1301	20771	4.9	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-TYN005M21-QNH	1301	12801	1301	20871	5.1	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	3G-DHA012M21-QNH	1301	12801	1301	20801	1.4	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA010M21-QNH	1301	12802	1301	22801	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA010M22-QNH	1301	12802	1301	22802	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA010M23-QNH	1301	12802	1301	22803	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA011M22-QNH	1301	12802	1301	22922	2.2	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-TYN018M11-QNH	1301	12802	1301	12471	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-TYN018M21-QNH	1301	12802	1301	22471	7.6	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-TYN018M41-QNH	1301	12802	1301	42471	7.6	4	1	1	7	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA008M22-QNH	1301	12802	1301	22492	2.1	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-HHA001M23-QNH	1301	12802	1301	20773	4.9	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-TYN005M22-QNH	1301	12802	1301	20872	5.1	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA004M42-QNH	1301	12802	1301	40482	7.3	4	1	1	7	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	3G-DHA012M22-QNH	1301	12802	1301	20802	1.4	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	3G-DHA010M21-QNH	1301	12803	1301	22801	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	3G-DHA010M22-QNH	1301	12803	1301	22802	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	3G-DHA010M23-QNH	1301	12803	1301	22803	0	1	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	3G-DHA011M23-QNH	1301	12803	1301	22923	2.2	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07

Automatic best Neighboring evaluation (3G2G missing)

Below is presented a sample representing the first missing **3G2G neighbors** (Source-Target) detected by Agileto module M3.4 for the cluster under investigation. The entire table containing a number of 64 missing neighbors detected (3G2G) is attached to this report.

Cell_Name S	Cell_Name T	RncId S	CellId S	LAC2G T	CellId T	Dist [Km]	Neighbor case	Neighbor Diff	FrqLayer S	FrqLayer T	Cluster S	Cluster T
3G-DHA010M11-QNH	QDH0121	1301	12801	13511	10801	1.4	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M11-QNH	QHH0023	1301	12801	13511	12283	7.5	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-DHA010M11-QNH	QTY0181	1301	12801	13511	12471	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	QDH0122	1301	12802	13511	10802	1.4	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M12-QNH	QTY0181	1301	12802	13511	12471	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	QDH0032	1301	12803	13511	10442	7.7	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA010M13-QNH	QHH0023	1301	12803	13511	12283	7.5	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-DHA011M11-QNH	QDH0042	1301	12921	13511	10482	8	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M11-QNH	QDH0121	1301	12921	13511	10801	1	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M11-QNH	QHH0023	1301	12921	13511	12283	6.4	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-DHA011M11-QNH	QHH0053	1301	12921	13511	12603	7.7	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-DHA011M11-QNH	QTY0051	1301	12921	13511	10871	7.3	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M12-QNH	QDH0042	1301	12922	13511	10482	8	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M12-QNH	QDH0082	1301	12922	13511	12492	4.3	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M12-QNH	QDH0122	1301	12922	13511	10802	1	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M12-QNH	QTY0052	1301	12922	13511	10872	7.3	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M13-QNH	QDH0042	1301	12923	13511	10482	8	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M13-QNH	QDH0123	1301	12923	13511	10803	1	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M13-QNH	QHH0016	1301	12923	13511	60773	4.1	4	1	1	2	Cluster_QNH_07	Cluster_QNH_07
3G-DHA011M13-QNH	QHH0023	1301	12923	13511	12283	6.4	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-DHA011M13-QNH	QHH0053	1301	12923	13511	12603	7.7	4	1	1	1	Cluster_QNH_07	Cluster_QNH_08
3G-TYN018M11-QNH	QTY0091	1301	12471	13511	12671	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-TYN018M11-QNH	QTY0101	1301	12471	13511	12901	5.5	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-TYN018M12-QNH	QTY0091	1301	12472	13511	12671	7.6	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-TYN024M11-QNH	QDH0033	1301	12811	13511	10443	7.3	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-TYN024M11-QNH	QTY0053	1301	12811	13511	10873	5.8	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA008M11-QNH	QDH0121	1301	12491	13511	10801	3.4	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07
3G-DHA008M13-QNH	QDH0093	1301	12493	13511	12523	5.8	4	1	1	1	Cluster_QNH_07	Cluster_QNH_07

Automatic best Neighboring evaluation

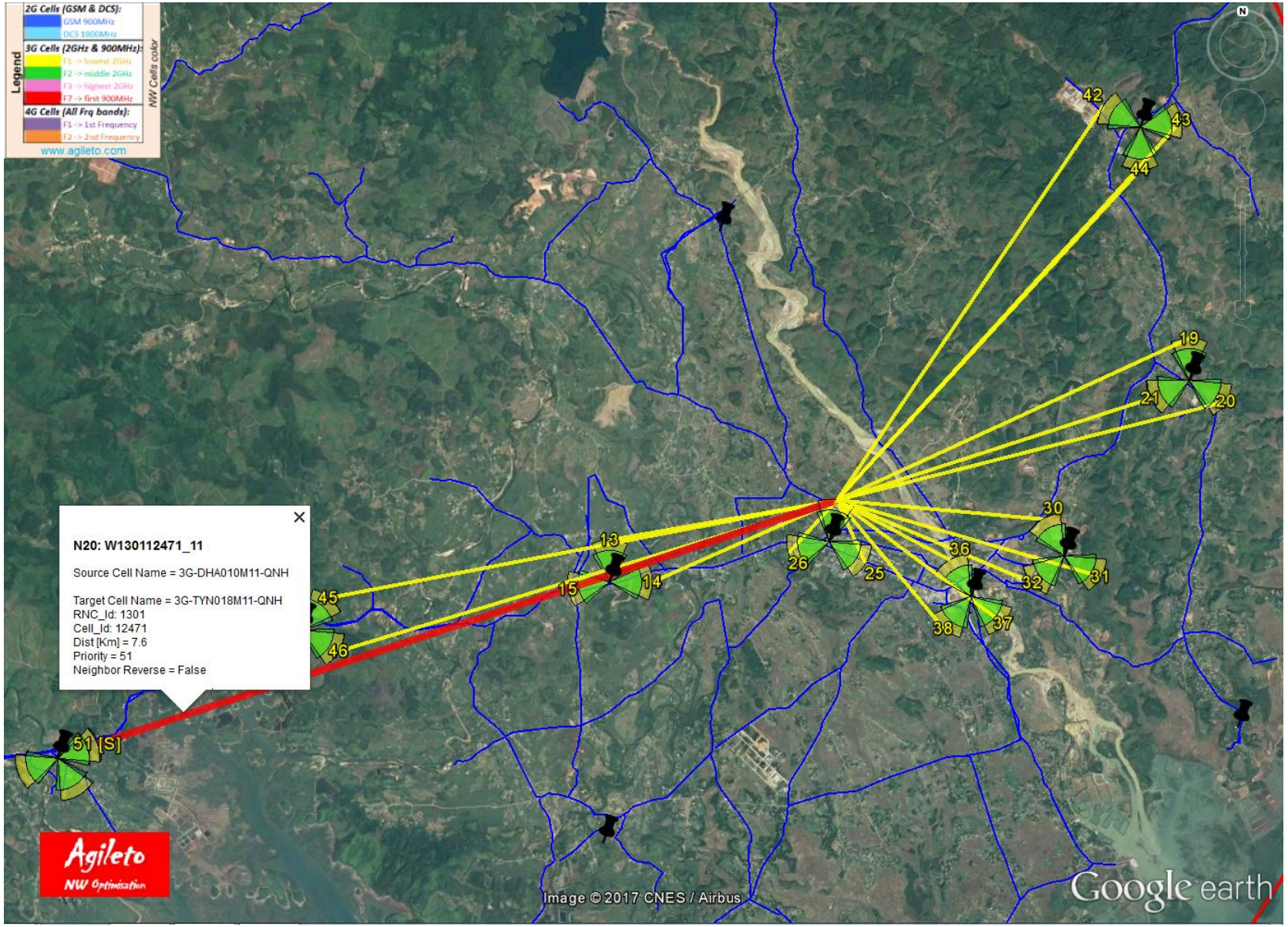
Example of the **3G3G** Neighbors presenting the existing neighbors declarations + the missing detected by Agileto module M3.4 (and mapped on Google Earth by M3.2)

- **Source Cell**: 3G-DHA010M11-QNH

On this example there are detected one (1) missing neighbors which are presented on the right side with red lines.

Obs.

The full representation in GE of all the 3G3G neighbors including the already existing neighbors + the missing detected (red lines) are attached to this report.



Automatic best Neighboring evaluation

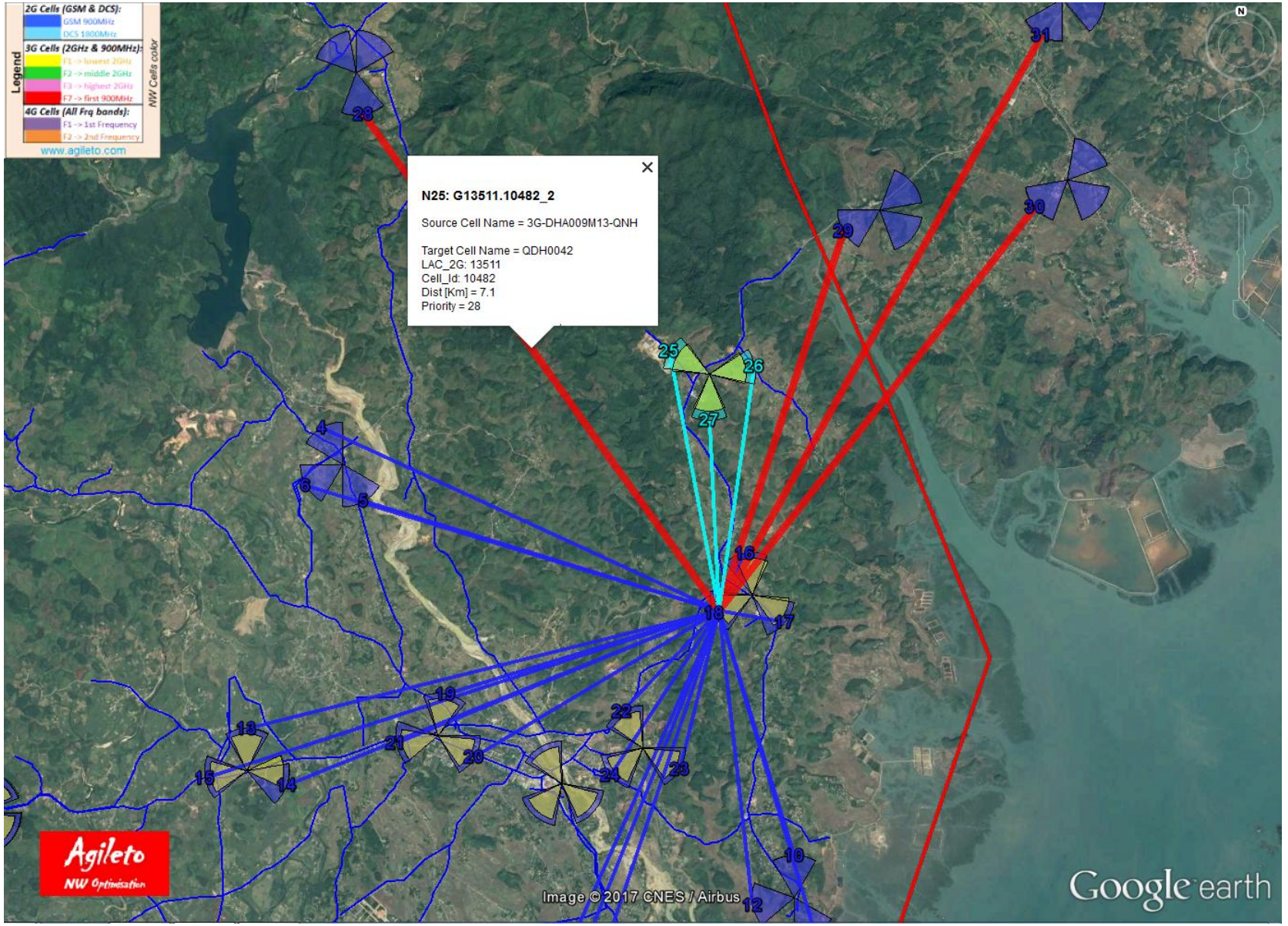
Example of the **3G2G** Neighbors presenting the existing neighbors declarations + the missing detected by Agileto module M3.4 (and mapped on Google Earth by M3.2)

- **Source Cell**: 3G-DHA009M13-QNH

On this example there are detected four (4) missing neighbors which are presented on the right side with red lines.

Obs.

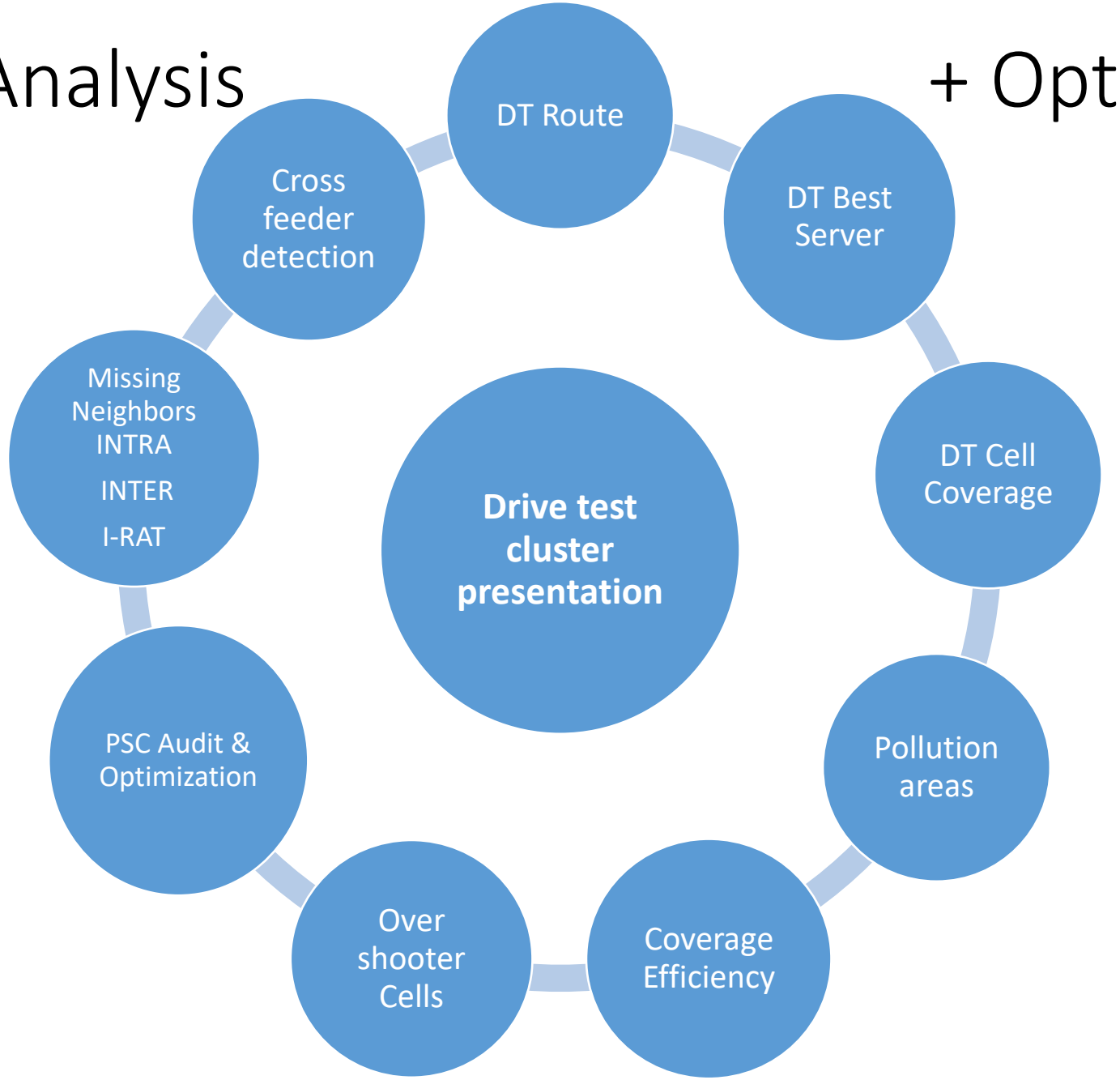
The full representation in GE of all the 3G2G neighbors including the already existing neighbors + the missing detected (red lines) are attached to this report.



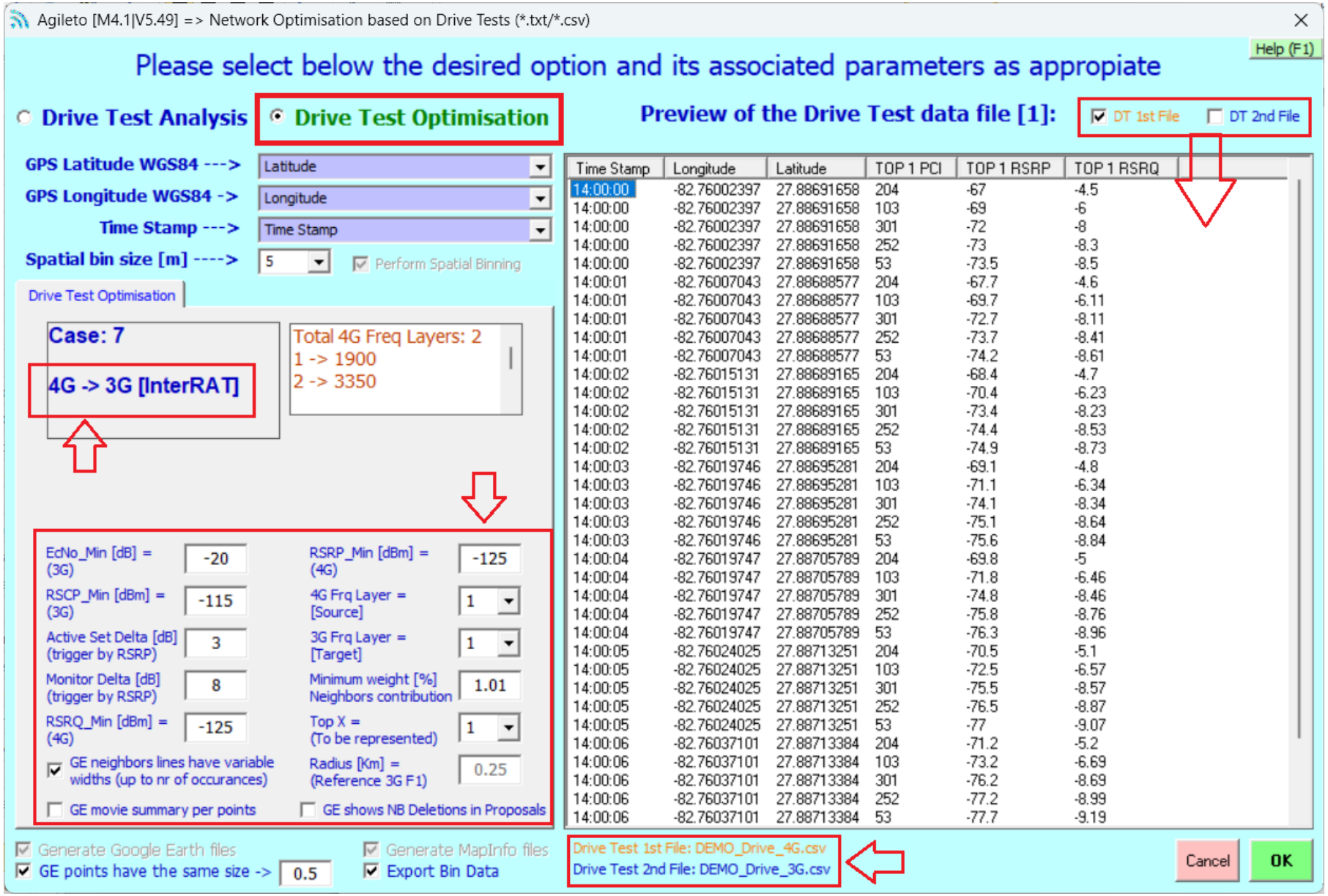
Agenda

- Introduction: Context, Inputs and Deliverables
- Geo-spatial representation of the Network/Cluster
- Cluster Audit & Sanity Check (RF main param + Neighbors)
- Automatic best Neighboring evaluation (missing detected)
- Drive Test (DT) Analysis and Optimization

Drive Test Analysis + Optimization



Drive Test Analysis + Optimization



Time Stamp	Longitude	Latitude	TOP 1 PCI	TOP 1 RSRP	TOP 1 RSRQ
14:00:00	-82.76002397	27.88691658	204	-67	-4.5
14:00:00	-82.76002397	27.88691658	103	-69	-6
14:00:00	-82.76002397	27.88691658	301	-72	-8
14:00:00	-82.76002397	27.88691658	252	-73	-8.3
14:00:00	-82.76002397	27.88691658	53	-73.5	-8.5
14:00:01	-82.76007043	27.88688577	204	-67.7	-4.6
14:00:01	-82.76007043	27.88688577	103	-69.7	-6.11
14:00:01	-82.76007043	27.88688577	301	-72.7	-8.11
14:00:01	-82.76007043	27.88688577	252	-73.7	-8.41
14:00:01	-82.76007043	27.88688577	53	-74.2	-8.61
14:00:02	-82.76015131	27.88689165	204	-68.4	-4.7
14:00:02	-82.76015131	27.88689165	103	-70.4	-6.23
14:00:02	-82.76015131	27.88689165	301	-73.4	-8.23
14:00:02	-82.76015131	27.88689165	252	-74.4	-8.53
14:00:02	-82.76015131	27.88689165	53	-74.9	-8.73
14:00:03	-82.76019746	27.88695281	204	-69.1	-4.8
14:00:03	-82.76019746	27.88695281	103	-71.1	-6.34
14:00:03	-82.76019746	27.88695281	301	-74.1	-8.34
14:00:03	-82.76019746	27.88695281	252	-75.1	-8.64
14:00:03	-82.76019746	27.88695281	53	-75.6	-8.84
14:00:04	-82.76019747	27.88705789	204	-69.8	-5
14:00:04	-82.76019747	27.88705789	103	-71.8	-6.46
14:00:04	-82.76019747	27.88705789	301	-74.8	-8.46
14:00:04	-82.76019747	27.88705789	252	-75.8	-8.76
14:00:04	-82.76019747	27.88705789	53	-76.3	-8.96
14:00:05	-82.76024025	27.88713251	204	-70.5	-5.1
14:00:05	-82.76024025	27.88713251	103	-72.5	-6.57
14:00:05	-82.76024025	27.88713251	301	-75.5	-8.57
14:00:05	-82.76024025	27.88713251	252	-76.5	-8.87
14:00:05	-82.76024025	27.88713251	53	-77	-9.07
14:00:06	-82.76037101	27.88713384	204	-71.2	-5.2
14:00:06	-82.76037101	27.88713384	103	-73.2	-6.69
14:00:06	-82.76037101	27.88713384	301	-76.2	-8.69
14:00:06	-82.76037101	27.88713384	252	-77.2	-8.99
14:00:06	-82.76037101	27.88713384	53	-77.7	-9.19

Drive test summary

Project: POC_REFERENCE

Input Drive Test File: Post-Swap-C07-Scan3G_F1.txt

DRIVE TEST SUMMARY:
Agileto => www.agileto.com © 2025 All rights reserved (support@agileto.com)
[M4.1|V5.23] => Network Optimisation based on Drive Tests (*.txt/*.csv)
User Login: Agileto| Run Time: 14Nov2024 19:54:01-19:55:08 [1min 7sec]

Input Drive Test measurement file: D:\Agileto\POC_REFERENCE\Drive_Tests\DT_Measurements\Post-Swap-Cluster07-Laptop1_202X1028\export\Final\Post-Swap-C07-Scan3G_F1.txt
Input OMC Snapshot file: D:\Agileto\POC_REFERENCE\OMC_Snapshots\01-11-202X\2G\cm_exp_202X1101_175740_QNH.xml
Input Agileto database reference file: D:\Agileto\POC_REFERENCE\MobileNW_Config\MobileNW_Config.xls

Drive Test post-processing -> Option Selected: 3G -> 3G [IntraFrequency]
Source Technology: 3G, Frequency layer = 1, DL_UARFCN = 10788
Target Technology: 3G, Frequency layer = 1, DL_UARFCN = 10788
Source: Nr of BestServers = 67
Target: Nr of BestServers = 67
EcNo Min [dB]: -25
RSCP Min [dBm]: -125
Active Set (Ec/No) Range (delta BestServer) for valid 'Best Servers' [dB]: 3
Monitoring Set (Ec/No) Range (delta BestServer) for valid Scanner measurements [dB]: 8

Minimum Neighbors Imposed Weight [%]: 1.01
Spatial binning operated: YES, -> bin size [m]: 10
Output Drive Test Network Optimisation file: D:\Agileto\POC_REFERENCE\Drive_Tests\DT_Optimisation\Bin10m_Post-Swap-C07-Scan3G_F1-3G3G_F1F1\Bin10m_Post-Swap-C07-Scan3G_F1-3G3G_F1F1_DT-NWOptim.xls

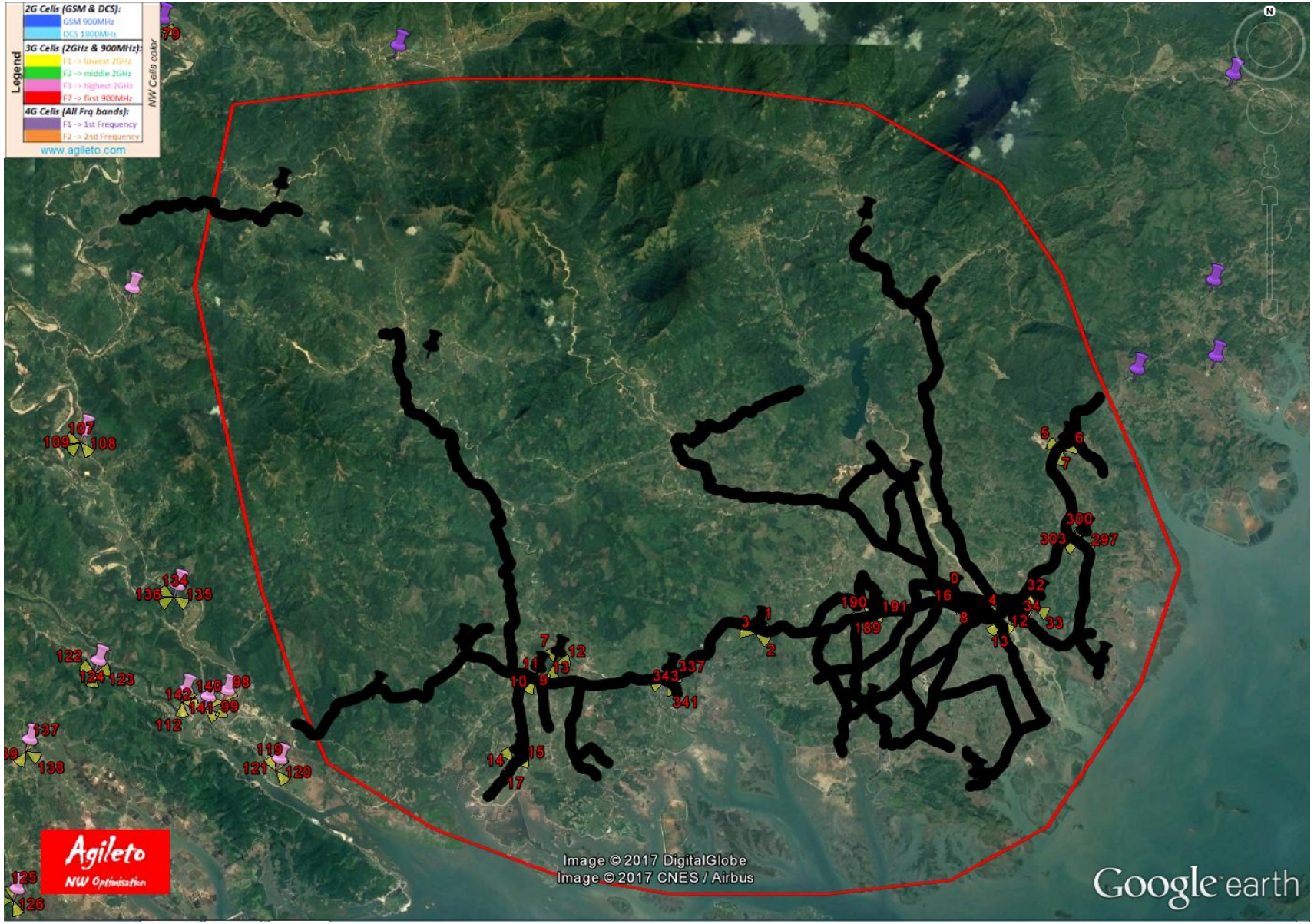
1) Total number of INPUT lines detected into DRIVE TEST measurements file: 235490, Drive Test => 65H 25min, [100%]
2) Total number of MOBILITY Drive Test measurements: 208756, Drive Test => 57H 59min, [88.65%]
3) Total number of STATIC [No Mobility detected] Drive Test measurements: 9959, Drive Test => 2H 46min, [4.23%]
4) Total number of INVALID GPS (Lat/Lon) lines: 0, Drive Test => 0H 0min, [0.00%]
5) Total number of INVALID DRIVE TEST SOURCE measurements: 16775, Drive Test => 4H 40min, [7.12%]
6) Total number of INVALID DRIVE TEST TARGET measurements: 0, Drive Test => 0H 0min, [0.00%]

Total number of points resulted after spatial binning aggregation: 18265 (bin size[m]=10)

Route of the 3G DT cluster layer F1

➢ Drive test route related to the 3G cluster layer F1:

- The DT covers ~ **182** Km (without counting repetitive routes)
- Total aggregated time of **DRIVE TEST detected** into measurements file: 100%
  - Total number of **MOBILITY** Drive Test measurements: 88.65%
  - Total number of **STATIC** [No Mobility detected] Drive Test measurements: 4.23%
  - Total number of **INVALID** Source Drive Test measurements: 7.12%

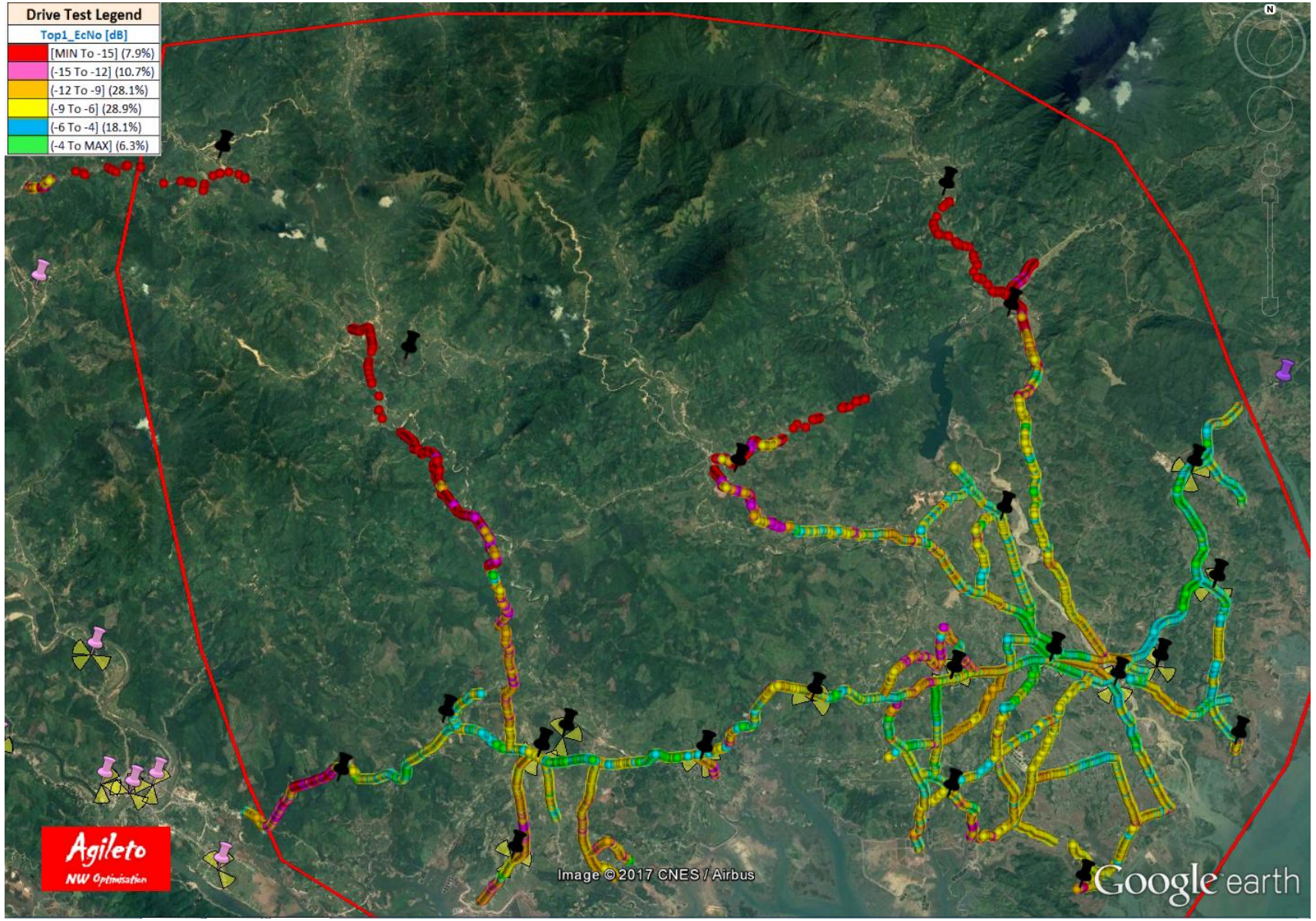


DT Best Server

Quality: Best server EcNo of the 3G DT cluster (layer F1)

➢ Percentage distribution of EcNo (Top1 = Best server)

- 24.4 %
  EcNo ≥ -6dB
  Good quality
- 57.0 %
  -12dB ≤ EcNo < -6 dB
  Acceptable quality
- 18.6 %
  EcNo < -12dB
  Bad quality



Coverage: Best server RSCP along the 3G DT cluster (layer F1)

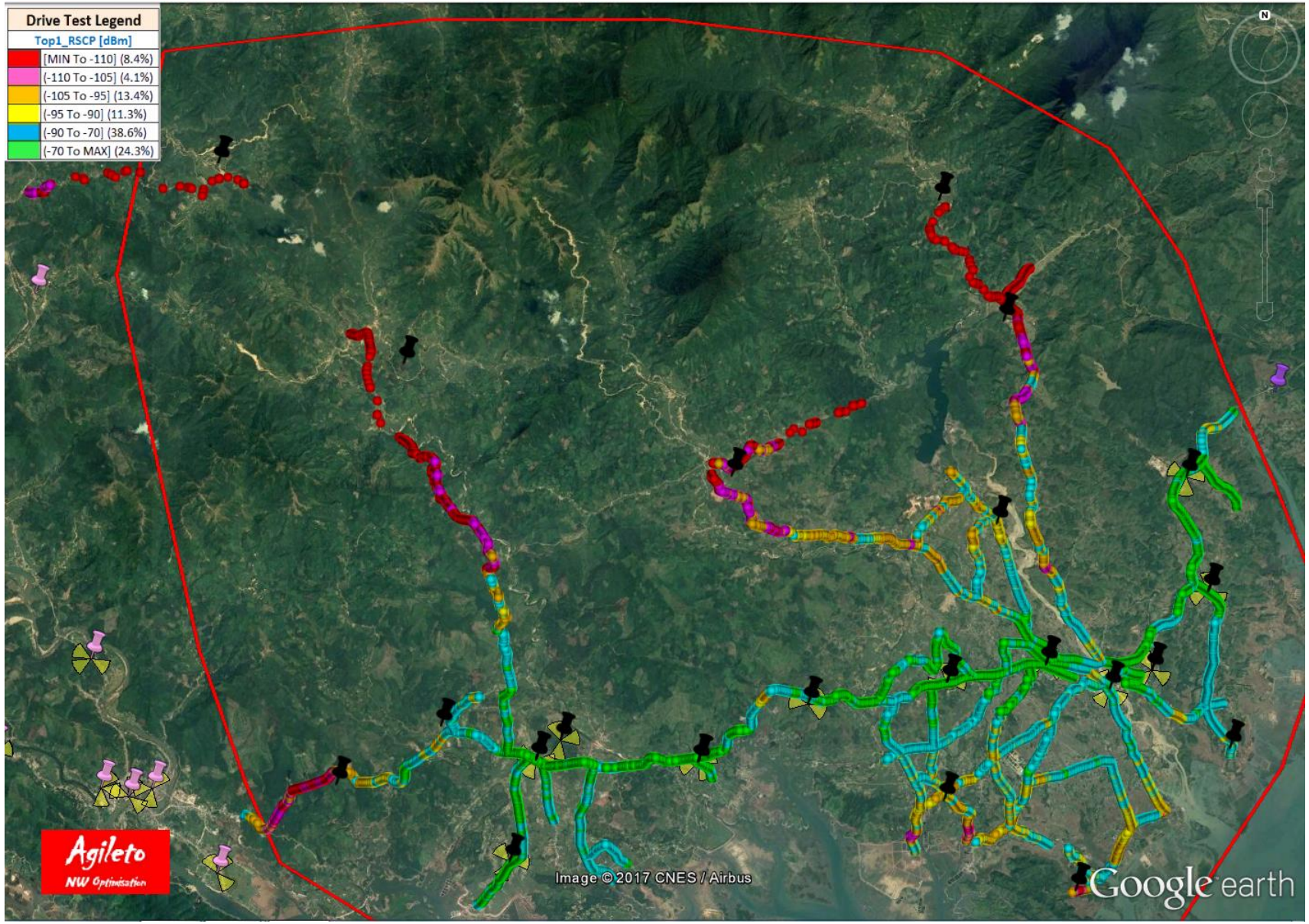
➢ Percentage distribution of RSCP (TOP1 = Best server)

- **24.3 % of the DT route**
  RSCP ≥ -70 dBm
  Deep Indoor, good coverage

- **38.6 % of the DT route**
  -90 dBm ≤ RSCP < -70 dBm
  Indoor acceptable coverage

- **24.7 % of the DT route**
  -105 dBm ≤ RSCP < -90 dBm
  Outdoor poor coverage

- **12.5 % of the DT route**
  RSCP < -105 dBm
  Bad coverage



Pollution areas

Cluster DT analysis: **Pollution** 3G

Definition:

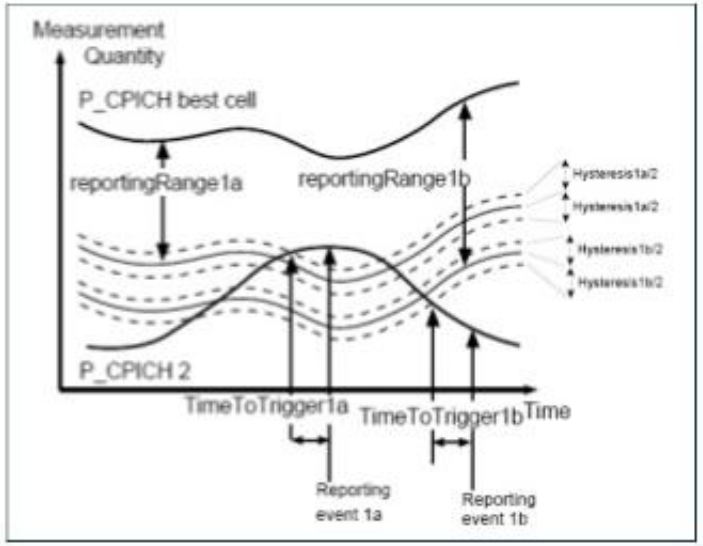
Polluted area = area where the *number of cells* detected within the "e1a" Reporting range against the best server, *exceeds* the operator's *Active Set size maximum* number of cells.

Generally we have:

- "e1a" Reporting range against the best server = **3 dB**
- Active Set size maximum = **3** (cells)

Event 1a, Primary CPICH enters Reporting Range

- Reported Cell not in AS
- Hysterisis and Time to trigger used to prevent ping pong reports
- If more than 1 cell is reported, best cell in terms of Ec/No is taken into consideration
- If AS is not full, Cell is Added otherwise worst cell is replaced (event 1c)



➢Both event 1a and 1b are depicted here.

Cluster DT analysis: **Pollution** (2G / 3G / 4G / 5G)

Similar like into the 3G technology, **Agileto** tool is using the same concepts of the **Active Set size** (**AS_size**) and **Active Set range** (**AS_range**) for the technologies **2G**/**4G**/**5G** too, as following:

Active Set size means the number of the cells (detected on each drive test measurement point) which are falling within a certain range (called **Active Set range**, *by default = 3dB*) against the best server (or the Top1).

Therefore although in reality for the technologies 2G/4G/5G there is a single active radio link between the mobile (UE) and a single cell, Agileto tool keeps the same concepts of **AS_size** and **AS_range** for the Drive Test analysis and optimization purpose.

General Definition for (**2G / 3G / 4G / 5G**):

Polluted area = area where **AS_size** (the number of the cells detected on each drive test measurement point within **AS_range** against the best server) exceeds a certain value (*by default = 3 cells*).

Conclusion:

Polluted area => Drive Test points where we have **AS_size > 3** (cells).

Notice:

AS_range => may be provided as input to Agileto tool (*by default = 3dB*).

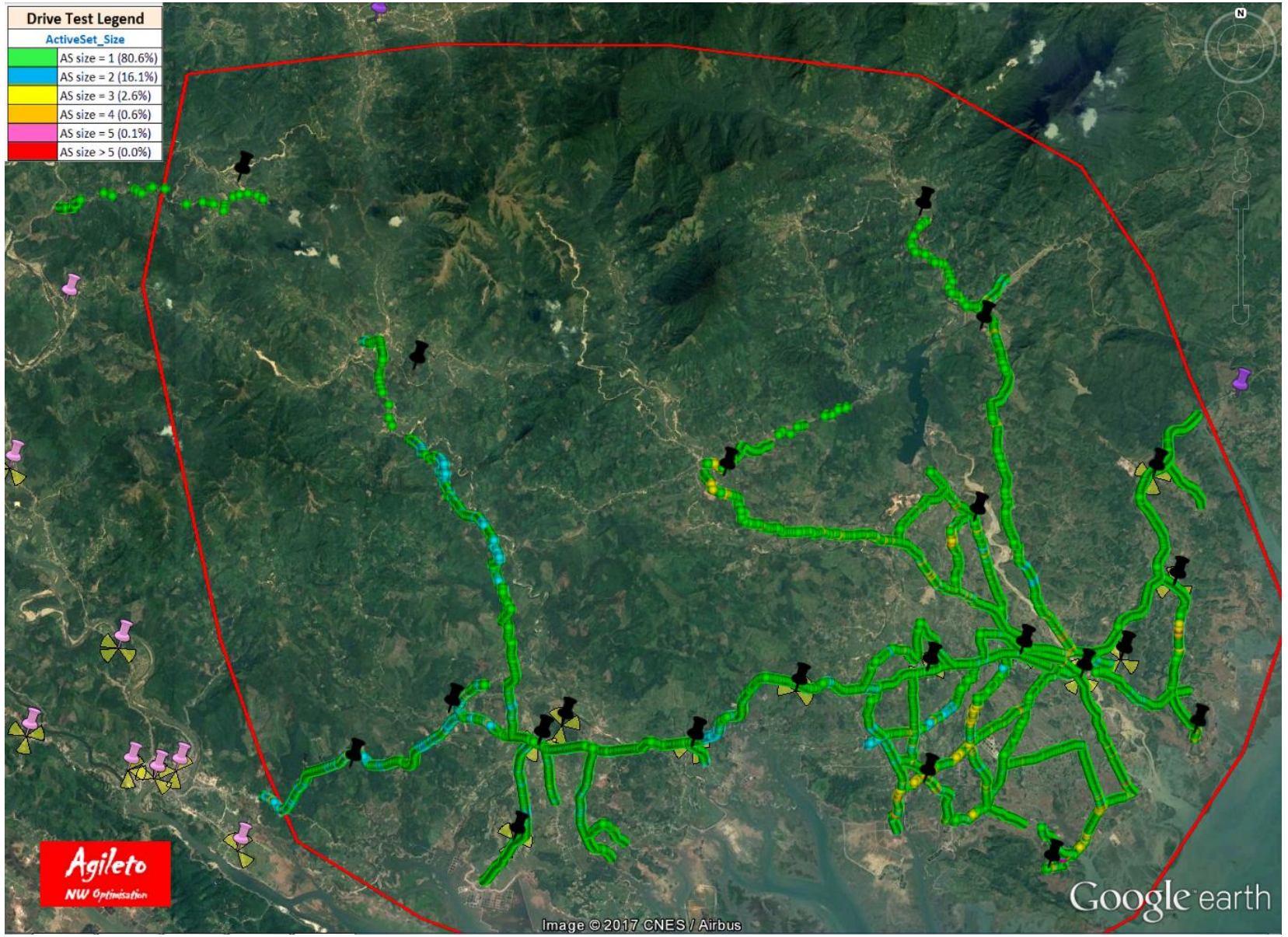
Cluster DT analysis: **Pollution**

➢ Percentage distribution of Active Set (AS) size along the DT route:

- **99.3 %**
  AS size ≤ 3
  No polluted area

- **0.7 %**
  AS size ≥ 4
  Polluted area

Obs:
Due to the low number of 3G cells on F1 frequency layer existing on this cluster it is somehow expected do not encounter important polluted areas (it is confirmed by the figures mentioned above).

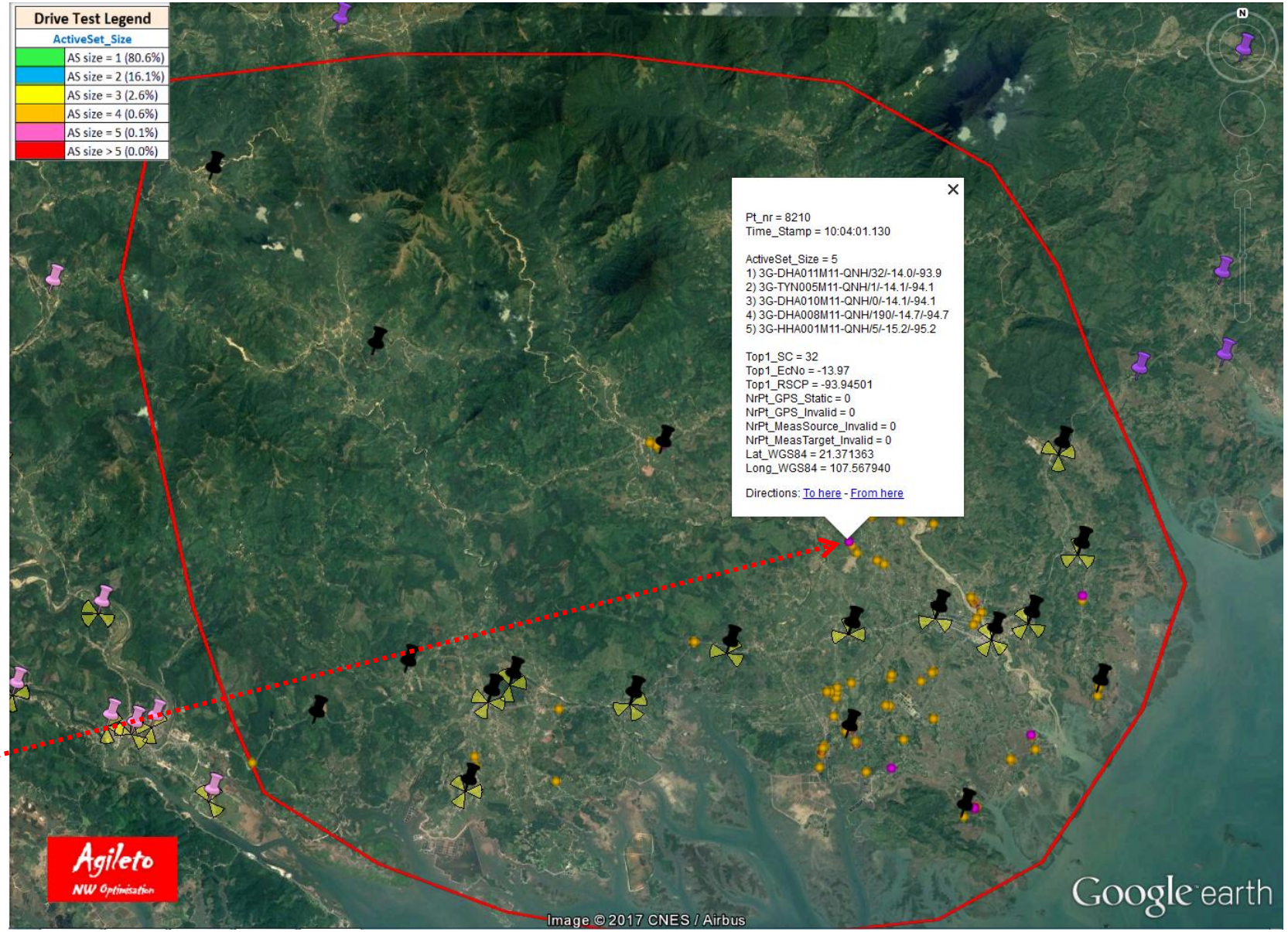


Cluster DT analysis: **Pollution**

➢ Geographically distribution of the points representing the Polluted areas:

- **0.7 %**
  AS ≥ 4
  Polluted areas

Notice:
Although it is not detected an important polluted area over the cluster under investigation, it was selected one of the rare cases (0.1%) where we have 5 cells concurrent in Active Set (ASet size = 5). For the general placement of the point please see the screenshot on the right side.



“Zoom in” on polluted area

- Example of pollution Area:

Active Set Size = 5

We have 5 cells which are detected within “e1a” reporting range of 3dB against the best server (Top1). The point number together with the timestamp + Top1 + the Cells detected within 3dB are presented below.

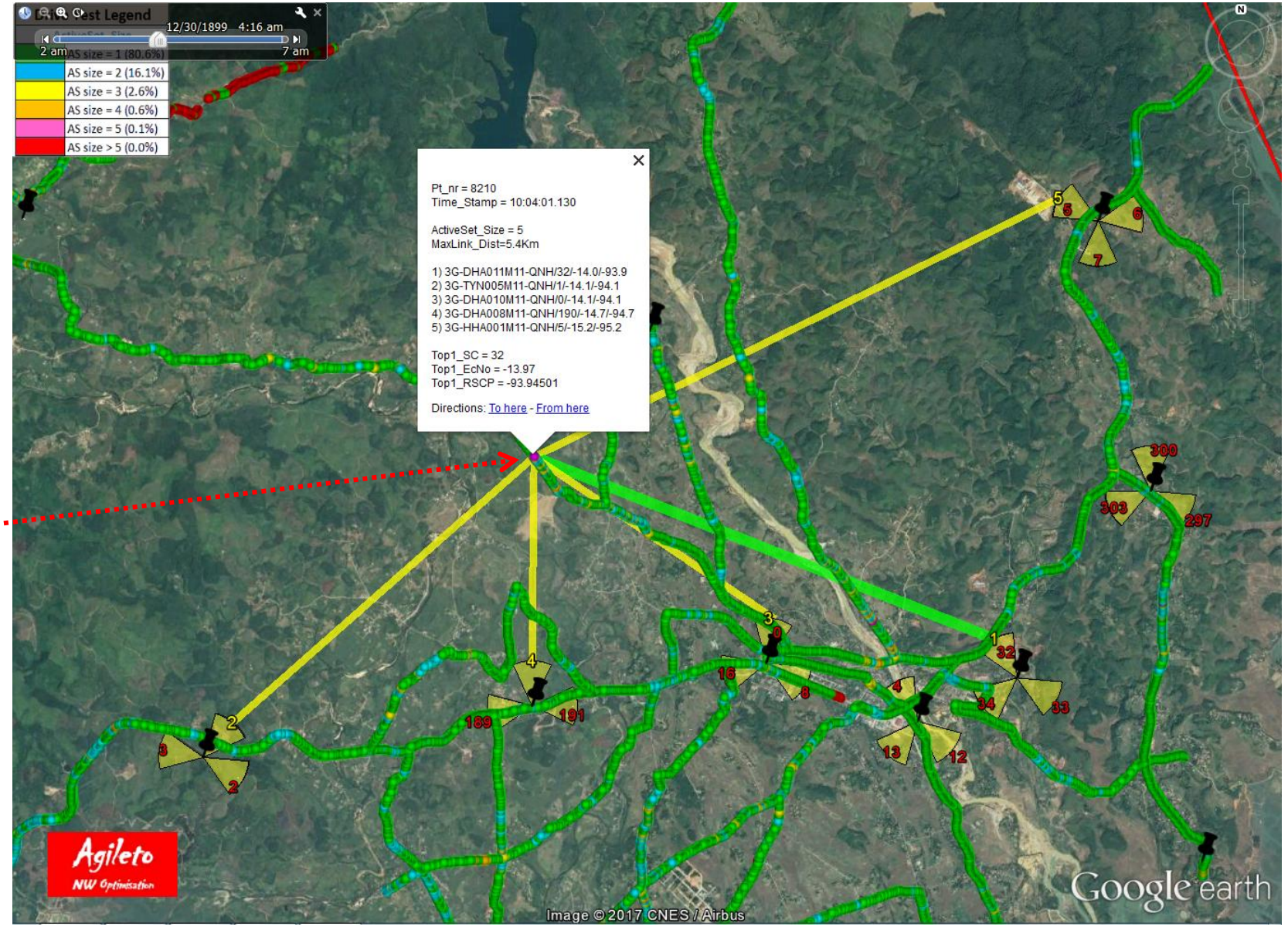
The coverage areas for each cell will be presented further on this section for the deeper investigation.

Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501



“Zoom in” on polluted area

- Full coverage for the Top1 cell detected:

3G-DHA011M11-QNH

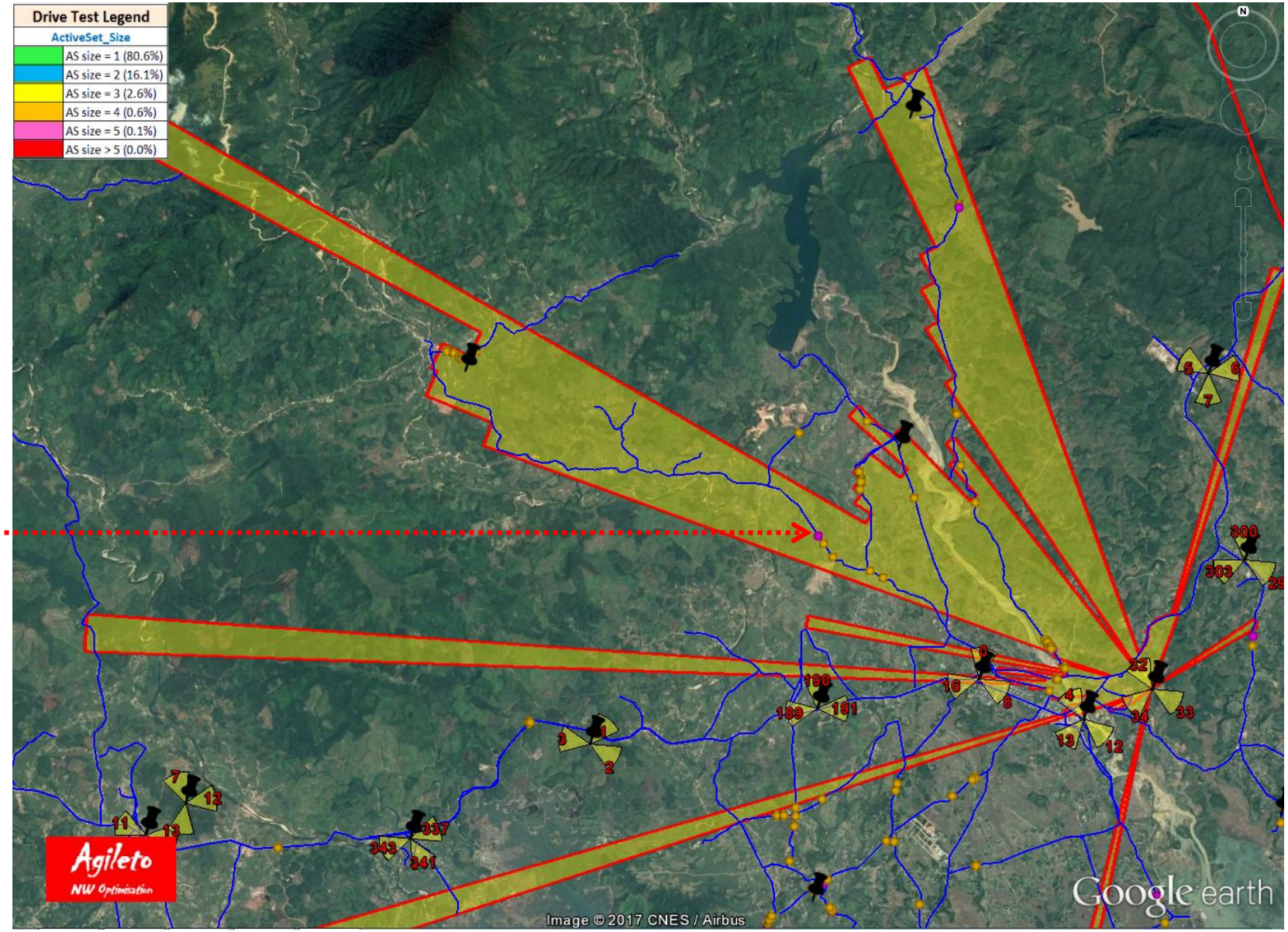
PSC = 32
Sector_ID = 1
Azimuth = 330
Ant_Height = 39.5
El_Tilt = 7
Mec_Tilt = 0

Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501

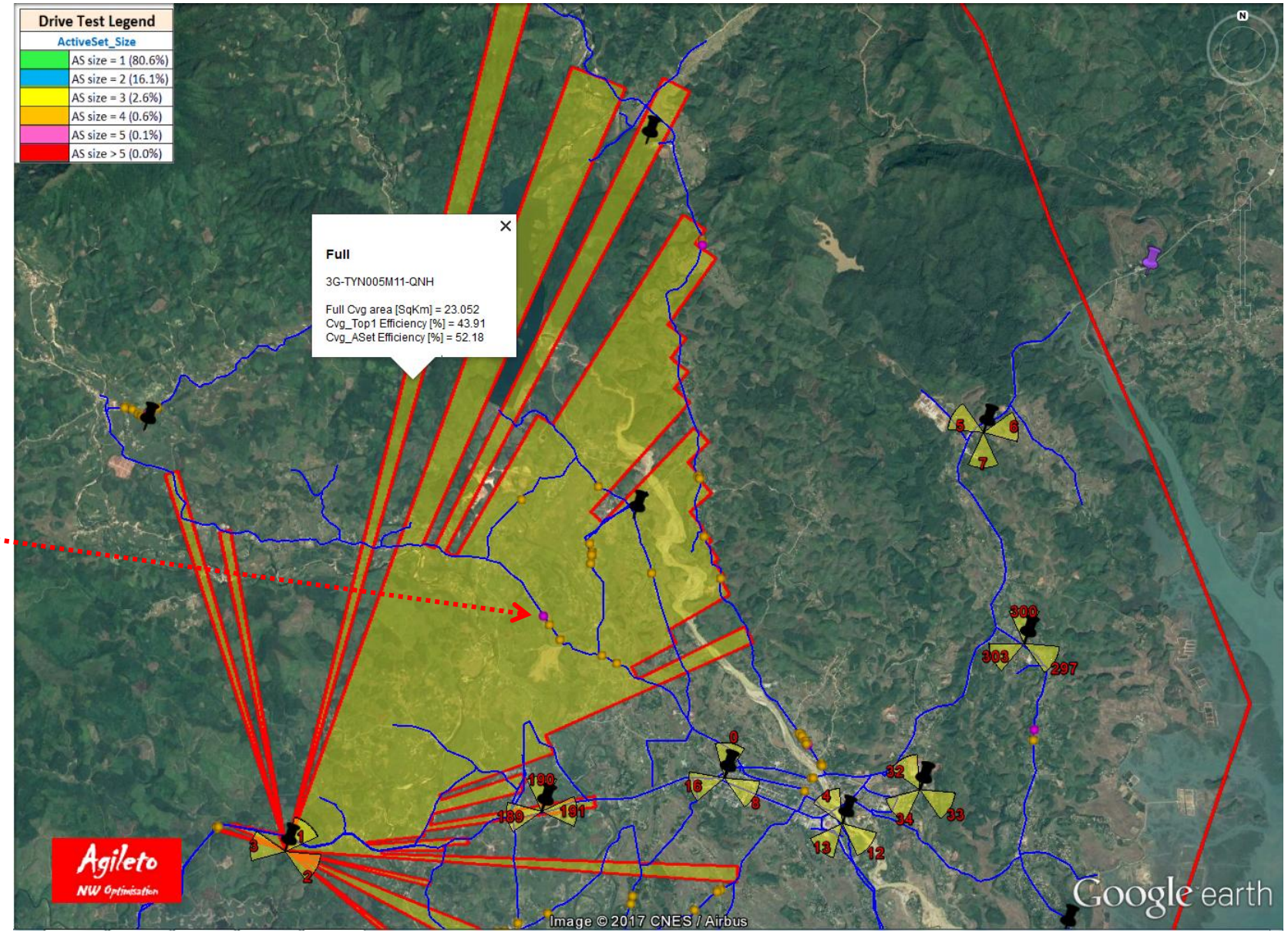


“Zoom in” on polluted area

- Full coverage for the Top2 cell detected:

3G-TYN005M11-QNH

PSC = 1
Sector_ID = 1
Azimuth = 40
Ant_Height = 37
El_Tilt = 4 => proposed New El_Tilt = 5
Mec_Tilt = 0



Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

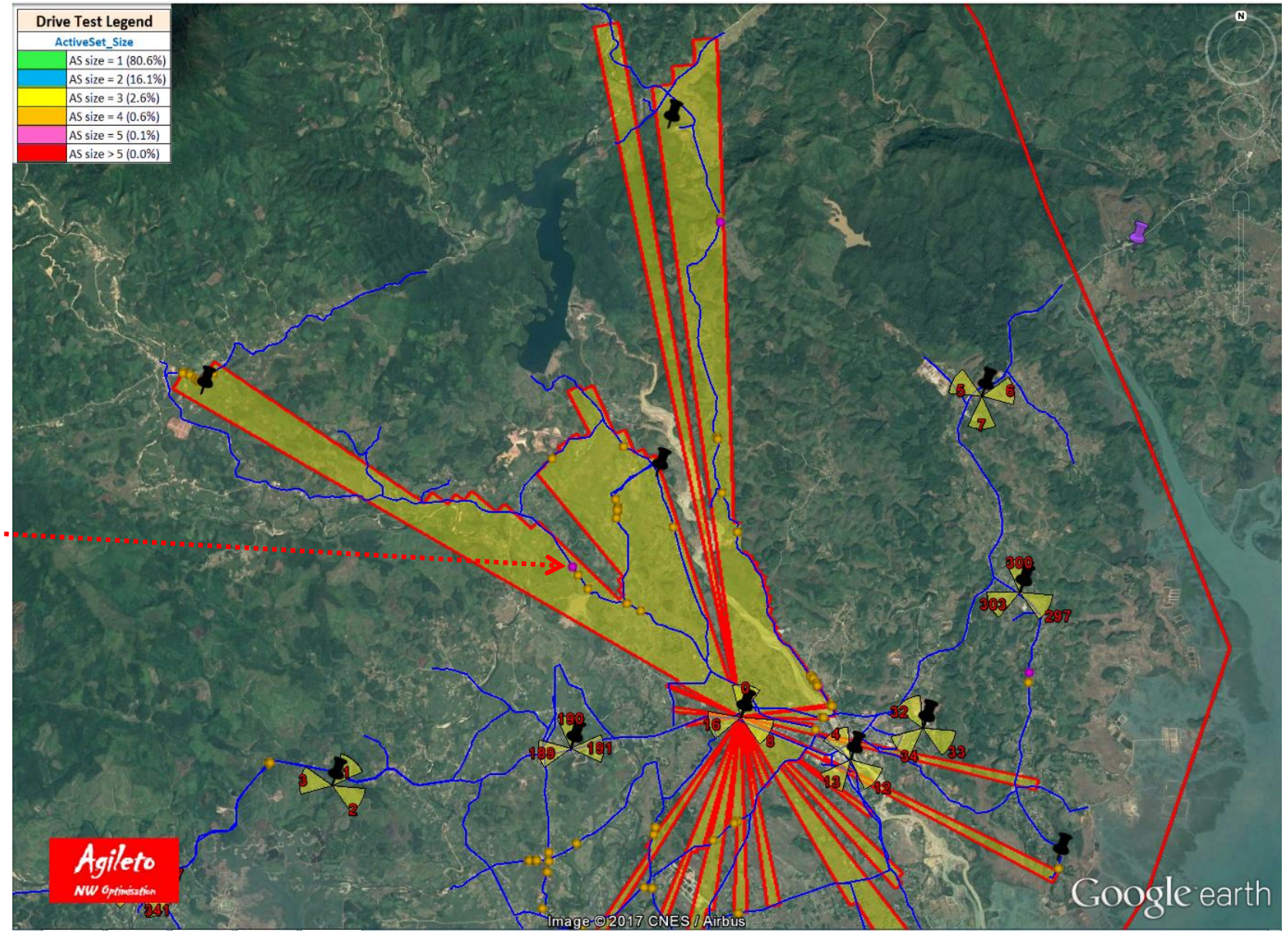
Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501

“Zoom in” on polluted area

- Full coverage for the Top3 cell detected:

3G-DHA010M11-QNH

PSC = 0
Sector_ID = 1
Azimuth = 10
Ant_Height = 36
El_Tilt = 5
Mec_Tilt = 0



Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

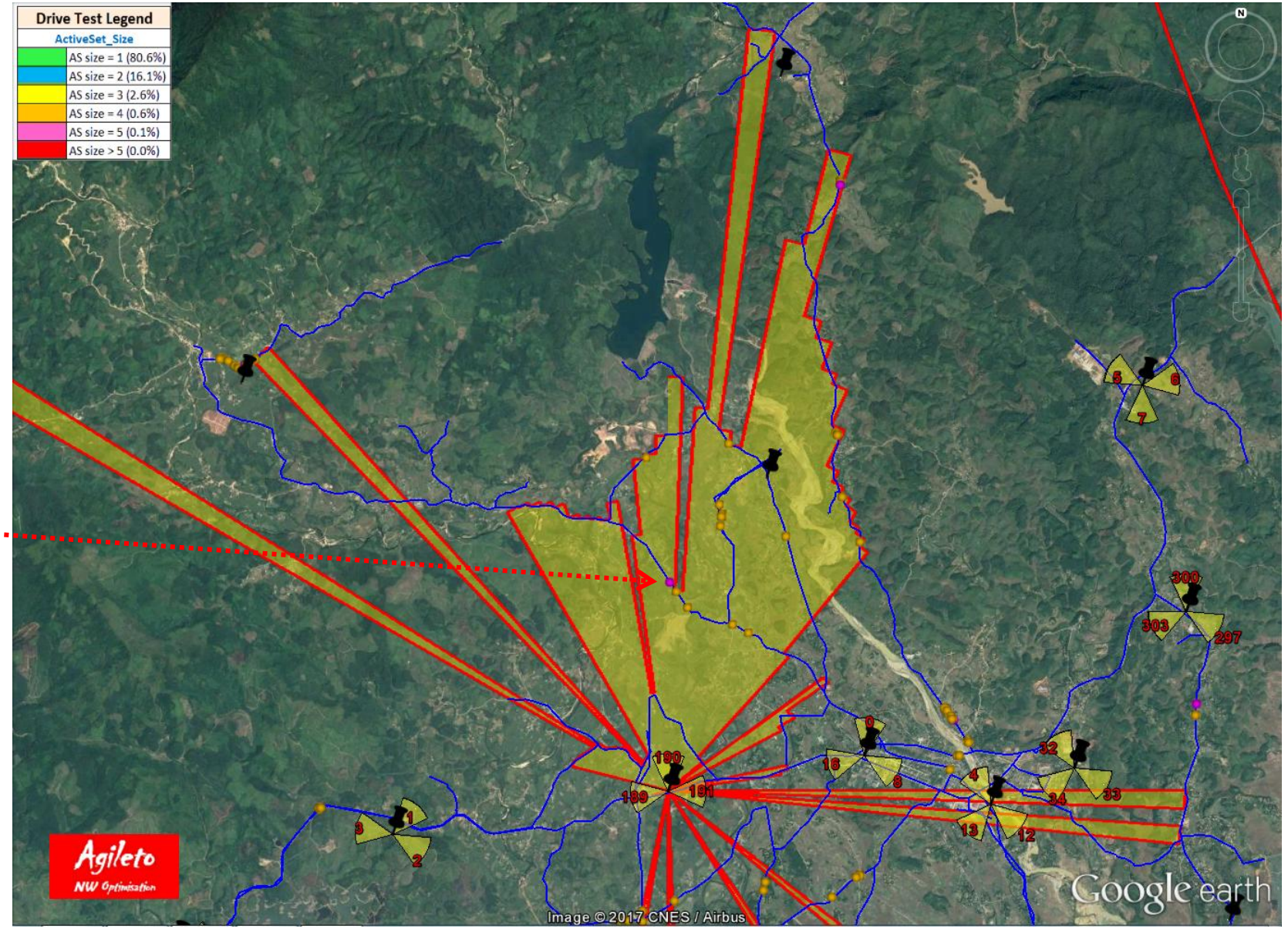
Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501

“Zoom in” on polluted area

- Full coverage for the Top4 cell detected:

3G-DHA008M11-QNH

PSC = 190
Sector_ID = 1
Azimuth = 0
Ant_Height = 32
El_Tilt = 3
Mec_Tilt = 4



Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

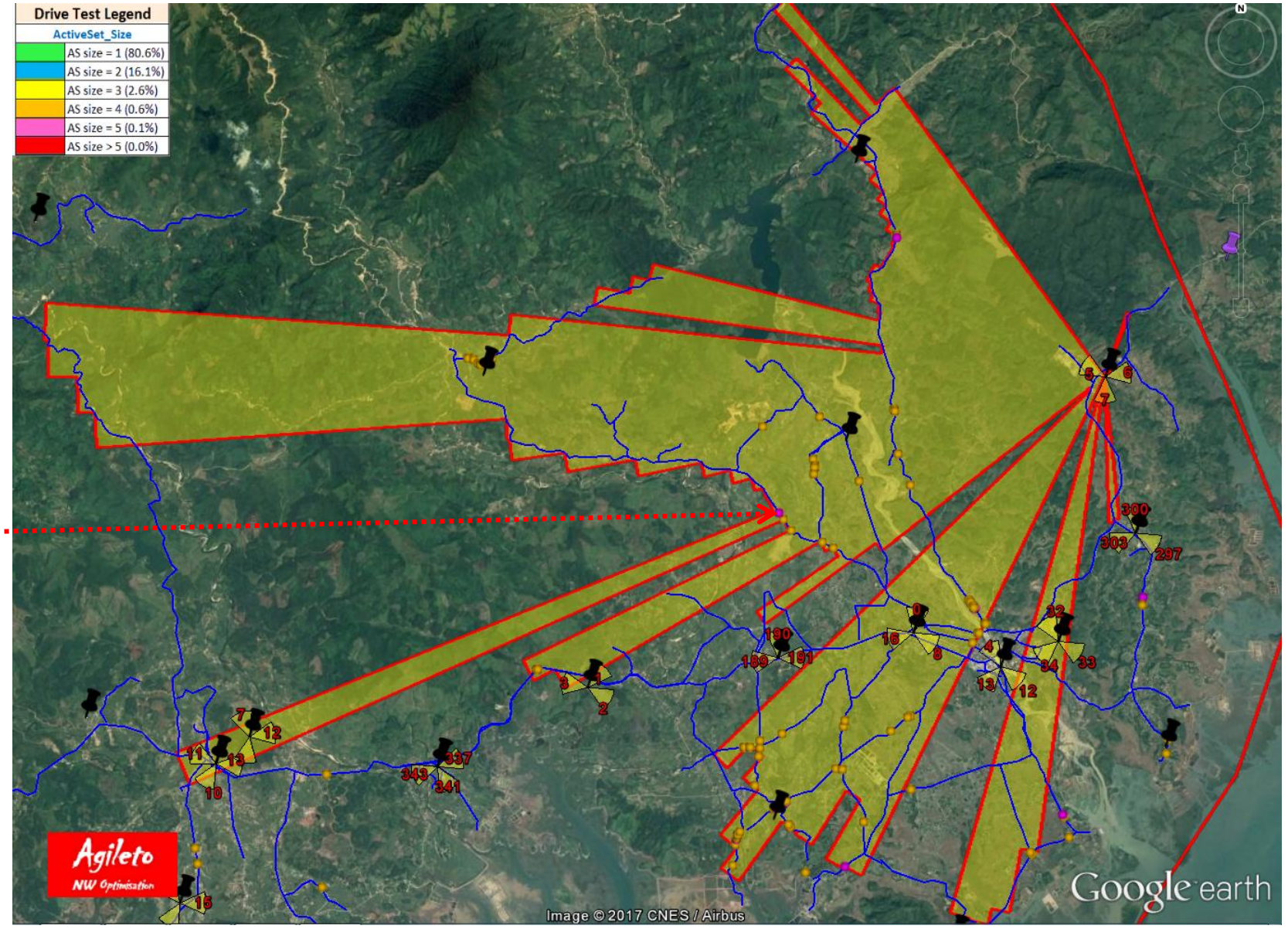
Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501

“Zoom in” on polluted area

- Full coverage for the Top5 cell detected:

3G-HHA001M11-QNH

PSC = 5
Sector_ID = 1
Azimuth = 300
Ant_Height = 39
El_Tilt = 2 => proposed New El_Tilt = 3
Mec_Tilt = 2



Pt_nr = 8210
Time_Stamp = 10:04:01.130

ActiveSet_Size = 5
MaxLink_Dist=5.4Km

1) 3G-DHA011M11-QNH/32/-14.0/-93.9
2) 3G-TYN005M11-QNH/1/-14.1/-94.1
3) 3G-DHA010M11-QNH/0/-14.1/-94.1
4) 3G-DHA008M11-QNH/190/-14.7/-94.7
5) 3G-HHA001M11-QNH/5/-15.2/-95.2

Top1_SC = 32
Top1_EcNo = -13.97
Top1_RSCP = -93.94501

Coverage efficiency

Coverage area vs Coverage efficiency

Coverage areas: Top1/ASet/Full:

(for the selected cell **3G-DHA008M13-QNH**)

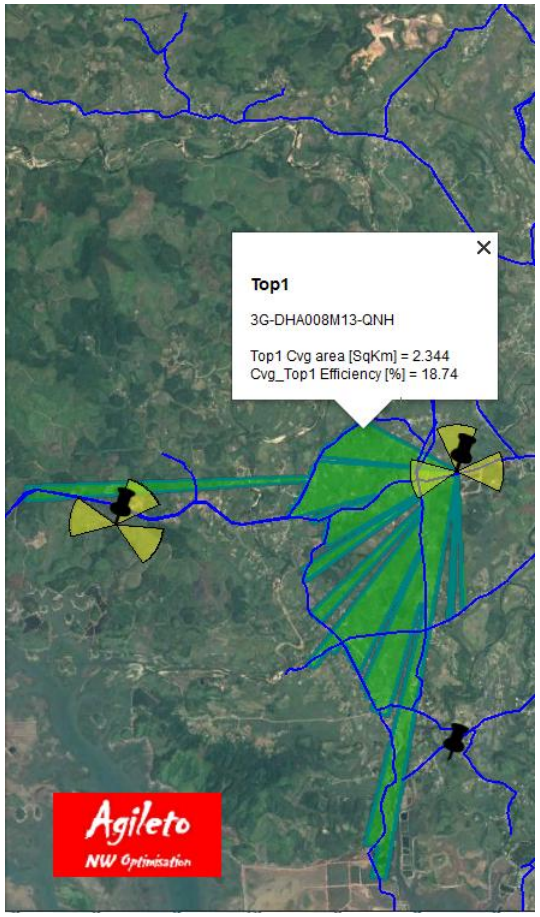
- Area where the cell is detected as the best server (Top1) (green border):
  Top1 Cvg area = 2.344 km²
- Area where the cell is detected into Active Set range of 3dB (blue border):
  ASet Cvg area = 3.547 km²
- Area where the cell is detected in Full Coverage (red border):
  Full Cvg area = 12.506 km²

Coverage Efficiency: Top1/ASet:

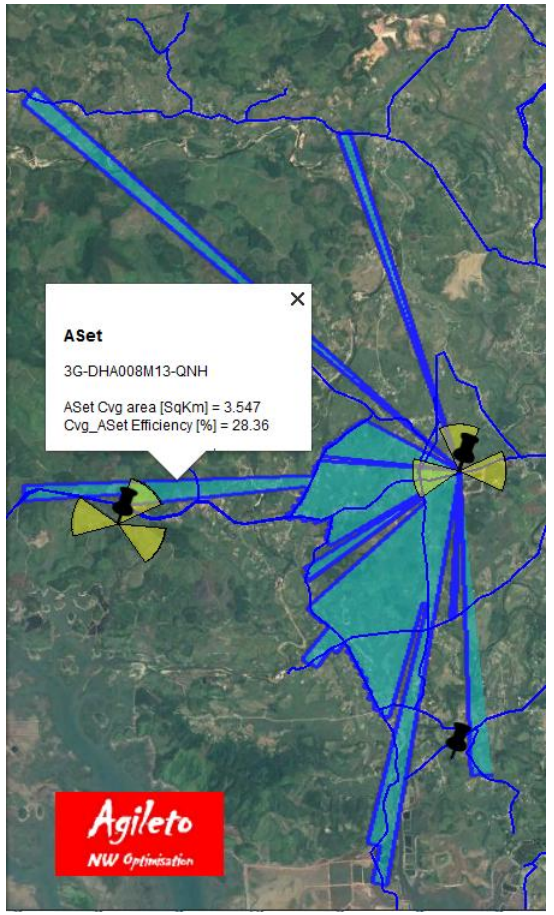
Definition: Cvg Efficiency [Top1 or ASet] = [Top1 or Aset] Cvg Area / Full Cvg Area

- **Coverage efficiency [Top1] = 18.74%**
  (2.344 / 12.506)
- **Coverage efficiency [ASet] = 28.36%**
  (3.547 / 12.506)

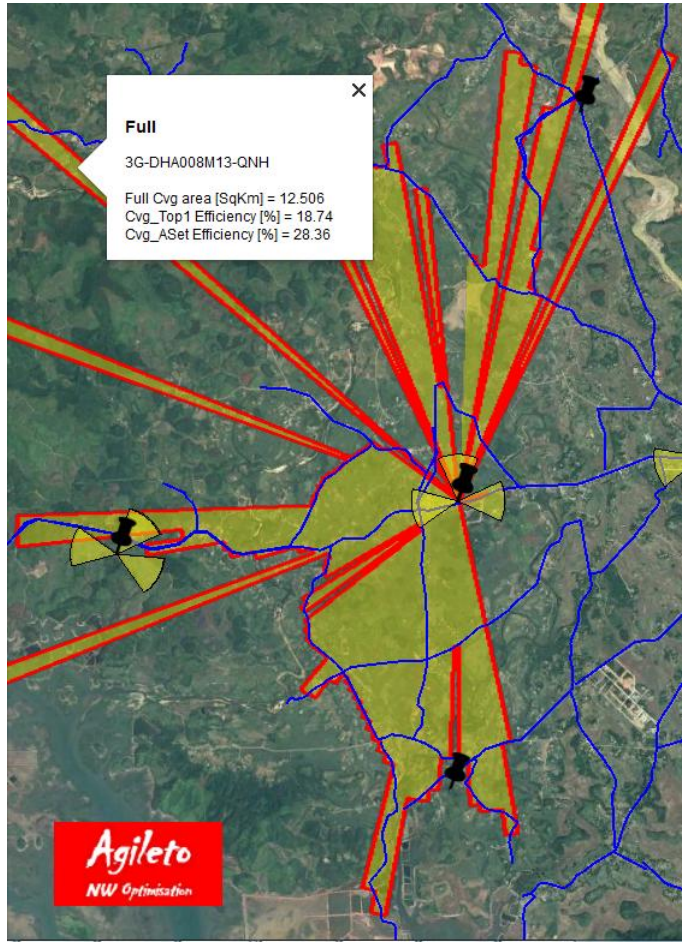
Top1



ASet



Full



Coverage area vs Coverage efficiency

- Coverage efficiency of one cell is an Agileto concept presenting the ratio between the specific coverage area of one cell (seen as Top1 – TopX) and its full (total) coverage area where the cell has been detected during the drive test.

- According with the cell position related to the best cell (Top1), there are mainly two interesting coverage areas efficiency, as following:
  - 1) Coverage Top1 efficiency
  - 2) Coverage ASet (Active Set) efficiency

- *The values of the **coverage areas efficiency** may provide a good indication if a cell is a **polluter** or it has a **lack of coverage*** – see some examples on the right side for several cells.

- The line in pink background (right side) was detailed **into the previous slide** as an example.

Google Earth cells coverage areas representations and the related spreadsheet containing all the cells belonging to the cluster are attached for further investigation.

Cell_Name	Cell_ID	Coverage Top1 [SqKm]	Coverage ASet [SqKm]	Coverage All [SqKm]	Cvg_Top1 Efficiency [%]	Cvg_ASet Efficiency [%]
3G-TYN018M11-QNH	1301|12471	2.336	8.043	19.714	11.85	40.8
3G-TYN018M12-QNH	1301|12472	2.056	3.536	15.187	13.54	23.28
3G-TYN018M13-QNH	1301|12473	1.98	2.412	15.602	12.69	15.46
3G-TYN024M11-QNH	1301|12811	2.445	3.299	13.898	17.59	23.74
3G-TYN024M12-QNH	1301|12812	5	20.046	32.508	15.38	61.66
3G-TYN024M13-QNH	1301|12813	1.143	1.407	9.41	12.15	14.95
3G-DHA008M11-QNH	1301|12491	8.236	10.079	17.055	48.29	59.09
3G-DHA008M12-QNH	1301|12492	6.085	13.048	32.229	18.88	40.49
3G-DHA008M13-QNH	1301|12493	2.344	3.547	12.506	18.74	28.36
3G-HHA001M11-QNH	1301|10771	39.854	47.569	66.086	60.31	71.98
3G-HHA001M12-QNH	1301|10772	0.629	0.629	8.611	7.3	7.31
3G-HHA001M13-QNH	1301|10773	0.298	1.504	18.55	1.61	8.11
3G-TYN005M11-QNH	1301|10871	10.122	12.029	23.052	43.91	52.18
3G-TYN005M12-QNH	1301|10872	10.012	14.137	28.955	34.58	48.82
3G-TYN005M13-QNH	1301|10873	0.546	0.675	13.278	4.11	5.09
3G-TYN012M11-QNH	1301|10881	6.309	6.548	9.291	67.91	70.48
3G-TYN012M12-QNH	1301|10882	0.194	0.475	2.024	9.59	23.46
3G-TYN012M13-QNH	1301|10883	1.737	1.975	3.678	47.22	53.69
3G-TYN014M11-QNH	1301|10901	17.273	18.241	32.174	53.69	56.69
3G-TYN014M12-QNH	1301|10902	11.623	14.55	42.745	27.19	34.04
3G-TYN014M13-QNH	1301|10903	0.092	0.092	12.682	0.72	0.72
3G-DHA009M11-QNH	1301|12521	3.353	3.579	15.618	21.47	22.92

Over shooter cells

Cluster DT analysis: Over-shooters

The table on the right side presents the **Overshooters** (OS) cells automatically detected by Agileto tool during the drive test post-processing and analysis of the input data.

This table is sorted in descending order from the worst overshooter cell - based on the number of affected/ polluted cells - to the last important detected.

The full table containing all the details concerning all the overshooters cells detected during the drive test together with their representation in Google Earth are provided as attachments to this report.

This section will present screenshots with detailed representation of the affected cells for the first worst **Top 4** overshooters detected. The other overshooters detected may be investigated - case by case - on Google Earth by using the full Google Earth package (files) provided for multiple topics (Top1/Full coverage, Coverage areas, Overshooters, etc) in order to classify if further actions are required.

Obs: Due to the very low number of the 3G cells existing on F1 frequency layer on this cluster it is not expected to get many overshooters (which affect an important nr. of cells). This assumption is conformed by the table on the right side.

Top Nr. of Worst overshooters (≥ 7 affected cells/overshooter): 4

Top 4 overshooters

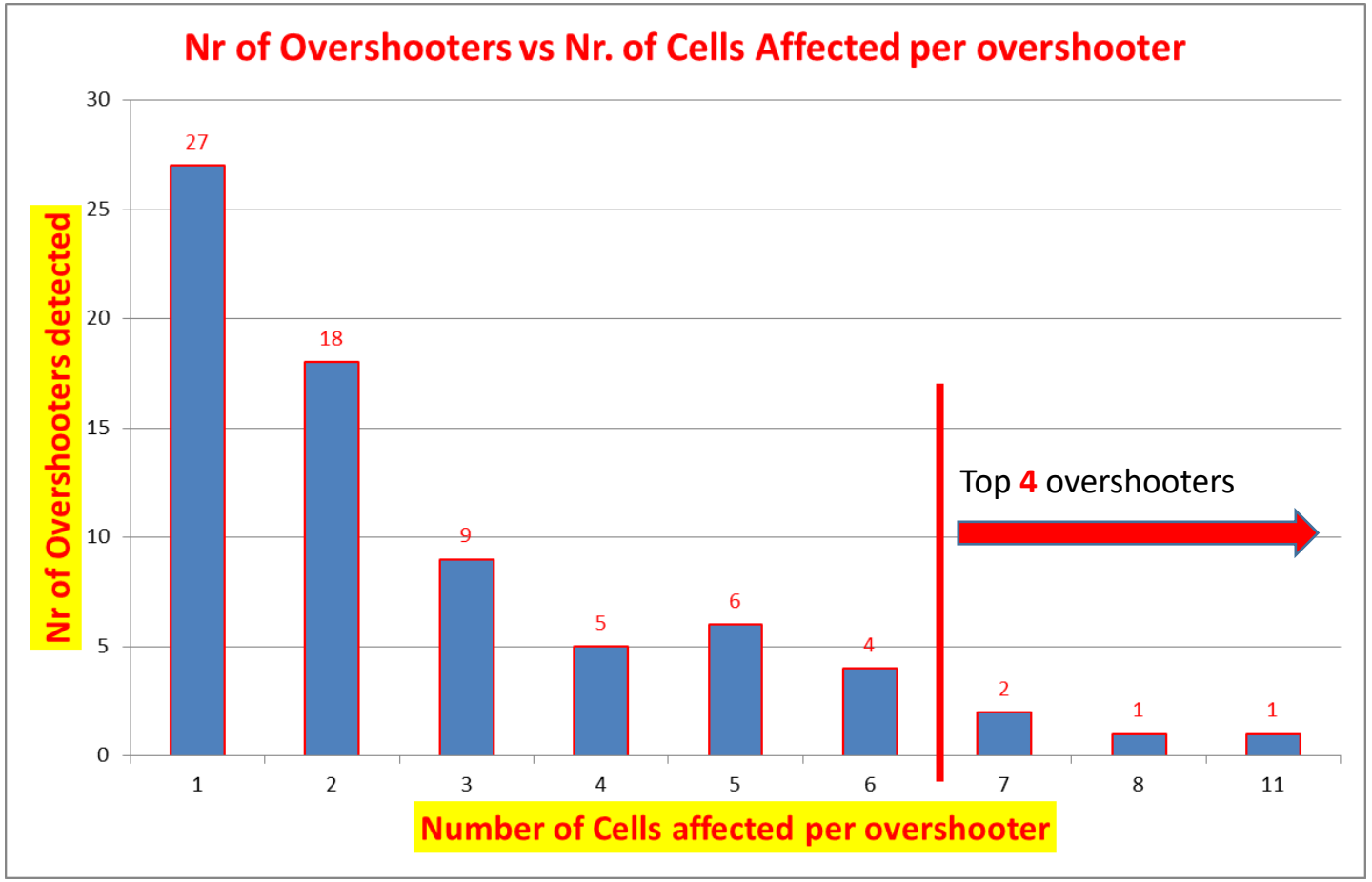
OS Number	Nr of Cells Affected per OS	OS RNC (Overshooter)	OS LocalCID	Overshooter CellName	OS SC	Region Overshooter
1	11	RN1301E	130110653	3G-MCI048M13-QNH	315	Cluster_QNH_12
2	8	RN1301E	130112202	3G-MCI009M12-QNH	465	Cluster_QNH_12
3	7	RN1301E	130110301	3G-BLU003M11-QNH	473	Cluster_QNH_08
4	7	RN1301E	130110802	3G-DHA012M12-QNH	12	Cluster_QNH_07
5	6	RN1301E	130112802	3G-DHA010M12-QNH	8	Cluster_QNH_07
6	6	RN1301E	130112453	3G-MCI026M13-QNH	167	Cluster_QNH_12
7	6	RN1301E	130112663	3G-MCI033M13-QNH	313	Cluster_QNH_11
8	6	RN1301E	130110773	3G-HHA001M13-QNH	7	Cluster_QNH_07
9	5	RN1301E	130112323	3G-MCI018M13-QNH	175	Cluster_QNH_12
10	5	RN1301E	130110353	3G-TYN008M13-QNH	112	Cluster_QNH_06
11	5	RN1301E	130112183	3G-MCI007M13-QNH	458	Cluster_QNH_12
12	5	RN1301E	130112333	3G-MCI019M13-QNH	367	Cluster_QNH_12
13	5	RN1301E	130112153	3G-MCI004M13-QNH	439	Cluster_QNH_12
14	5	RN1301E	130110533	3G-HHA017M13-QNH	386	Cluster_QNH_09
15	4	RN1301E	130110351	3G-TYN008M11-QNH	110	Cluster_QNH_06
16	4	RN1301E	130112392	3G-TYN016M12-QNH	123	Cluster_QNH_06
17	4	RN1301E	130110431	3G-TYN004M11-QNH	107	Cluster_QNH_06
18	4	RN1301E	130112372	3G-TYN015M12-QNH	120	Cluster_QNH_06
19	4	RN1301E	130110352	3G-TYN008M12-QNH	111	Cluster_QNH_06
20	3	RN1301E	130112471	3G-TYN018M11-QNH	337	Cluster_QNH_07

Cluster DT analysis: Over-shooters

Top **4** overshooters

OS Number	Nr of Cells Affected per OS
1	11
2	8
3	7
4	7
5	6
6	6
7	6
8	6
9	5
10	5
11	5
12	5
13	5
14	5
15	4
16	4
17	4
18	4
19	4
20	3

Top Nr. of Worst overshooters (≥ **7** affected cells/overshooter): 4



Top worst overshooters Cells

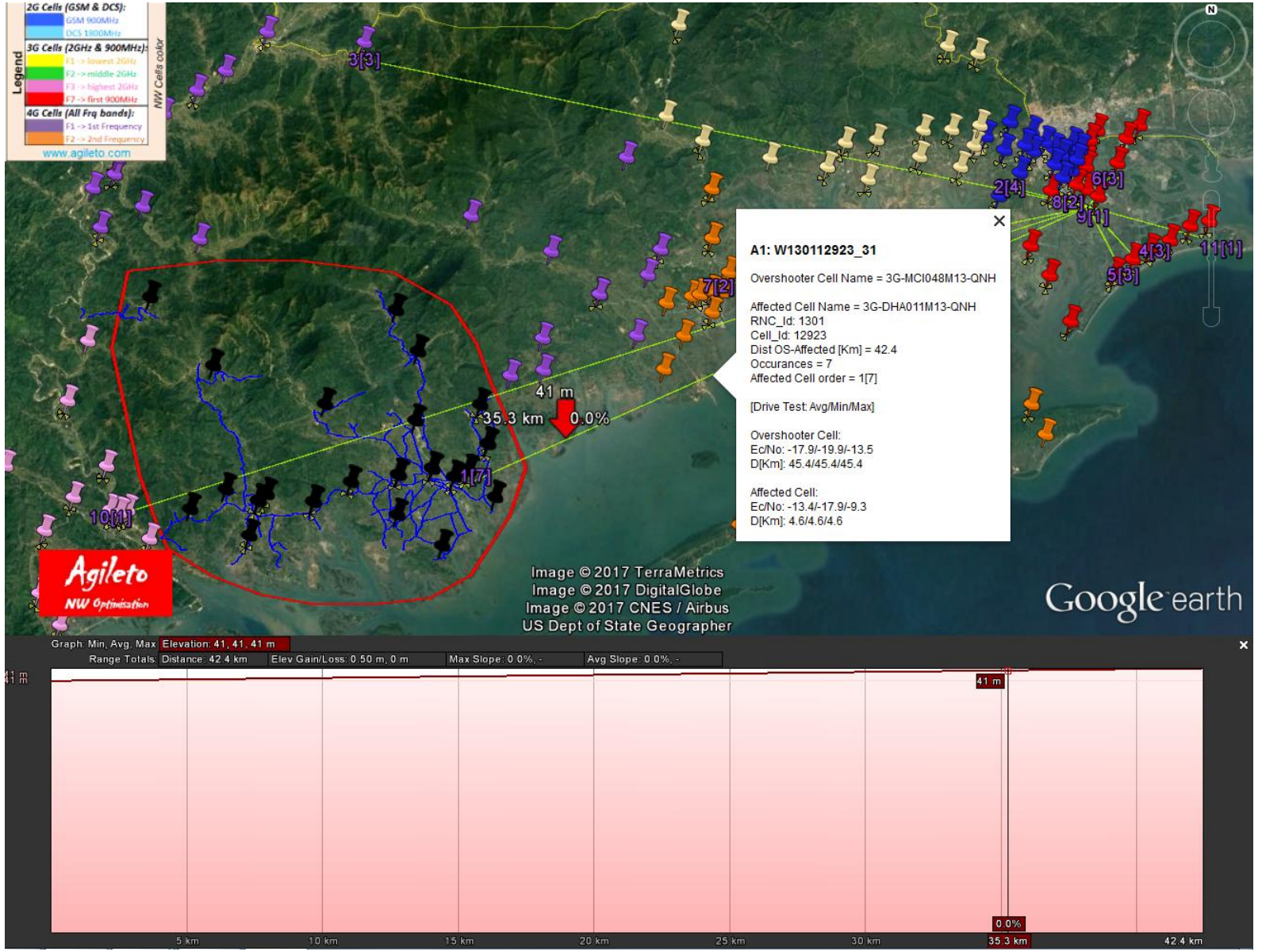
- **Over-shooter cell:**
  3G-MCI048M13-QNH
  (automatically detected by Agileto)

- Nr. of affected cells: **11**

The green lines are links between the overshooter cell and all its affected cells.

At the edge of each line is presented the order of the affected cell per overshooter based on the number of occurrences detected during the drive test -> Ex: 1[7].

3G-MCI048M13-QNH
Cell Code = W130110653_31
PSC = 315
UARFCN = 10788
LocalCID = 130110653
Sector_ID = 3
Azimuth = 290
Ant_Height = 39
El_Tilt = 2
Mec_Tilt = 4
Cluster = Cluster_QNH_12
LAC = 13019
RNC_Name = RN1301E
RNC_Id = 1301
Cell_Id = 10653



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Top worst overshooters Cells

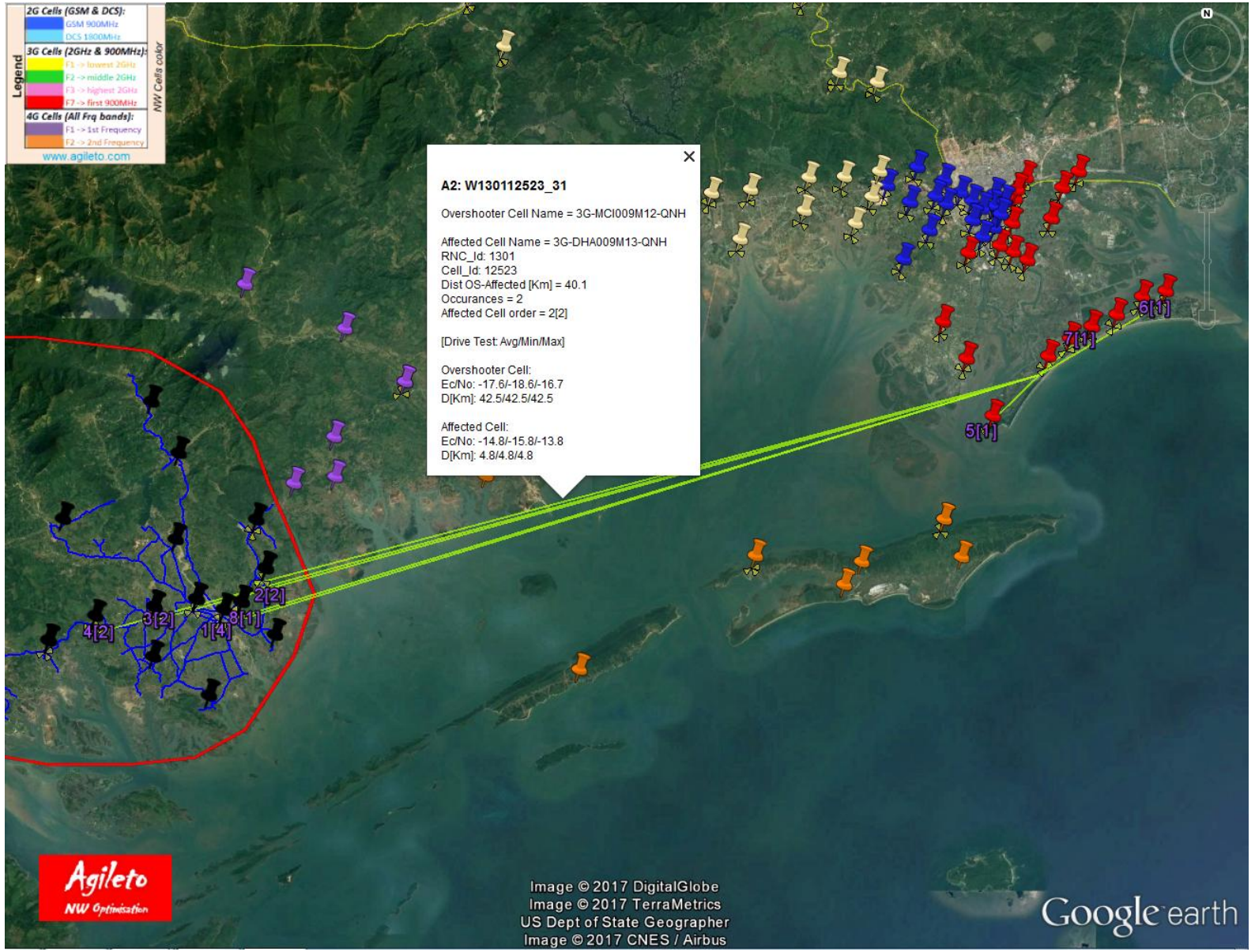
- **Over-shooter cell:**
  3G-MCI009M12-QNH
  (automatically detected by Agileto)

- Nr. of affected cells: **8**

The green lines are links between the overshooter cell and all its affected cells.

At the edge of each line is presented the order of the affected cell per overshooter based on the number of occurrences detected during the drive test.

3G-MCI009M12-QNH
Cell Code = W130112202_21
PSC = 465
UARFCN = 10788
LocalCID = 130112202
Sector_ID = 2
Azimuth = 220
Ant_Height = 25
El_Tilt = 2
Mec_Tilt = 0
Cluster = Cluster_QNH_12
LAC = 13019
RNC_Name = RN1301E
RNC_Id = 1301
Cell_Id = 12202



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Top worst overshooters Cells

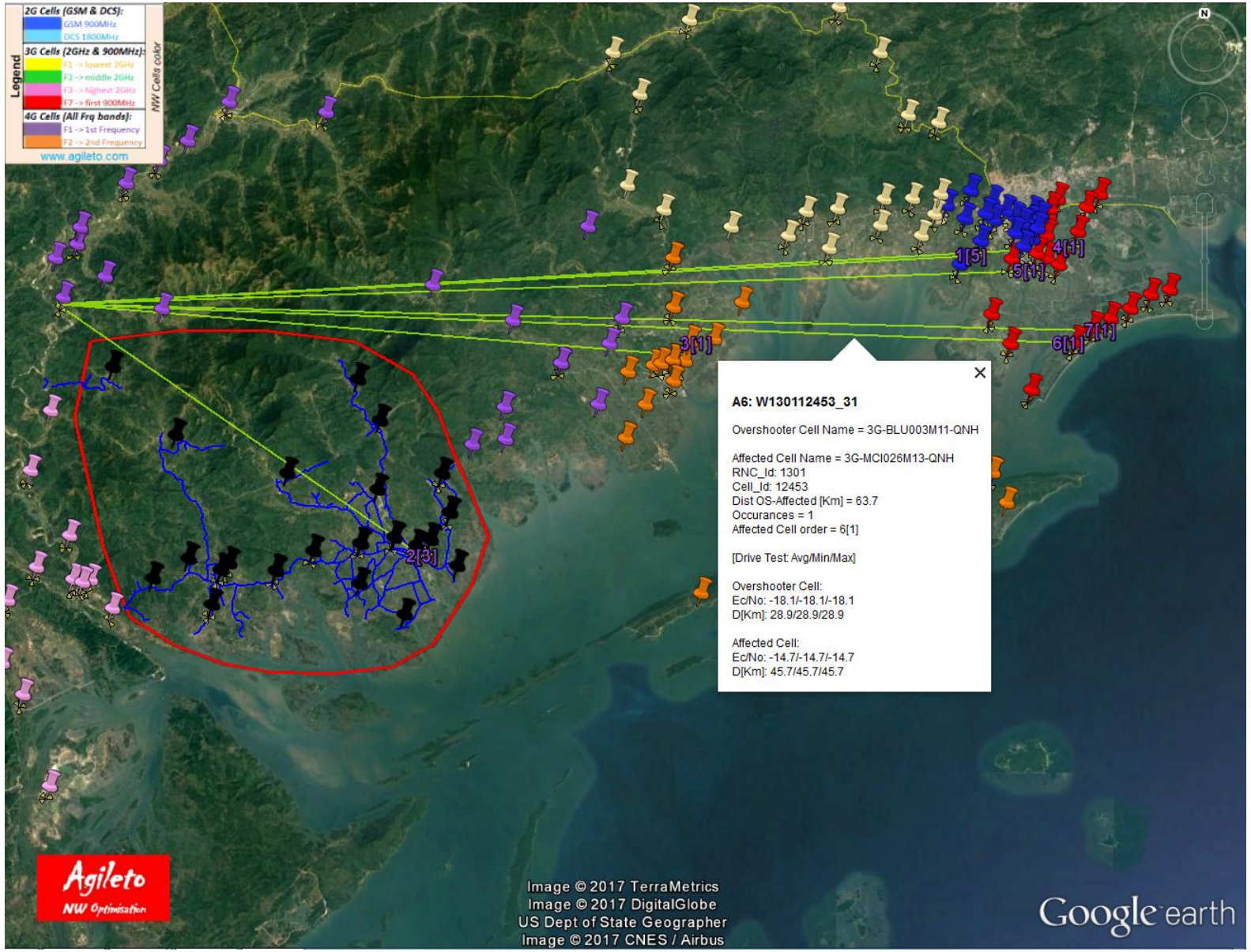
- **Over-shooter cell:**
  3G-BLU003M11-QNH
  (automatically detected by Agileto)

- Nr. of affected cells: **7**

The green lines are links between the overshooter cell and all its affected cells.

At the edge of each line is presented the order of the affected cell per overshooter based on the number of occurrences detected during the drive test.

3G-BLU003M11-QNH
Cell Code = W130110301_11
PSC = 473
UARFCN = 10788
LocalCID = 130110301
Sector_ID = 1
Azimuth = 340
Ant_Height = 36
El_Tilt = 3
Mec_Tilt = 1
Cluster = Cluster_QNH_08
LAC = 13019
RNC_Name = RN1301E
RNC_Id = 1301
Cell_Id = 10301



Top worst overshooters Cells

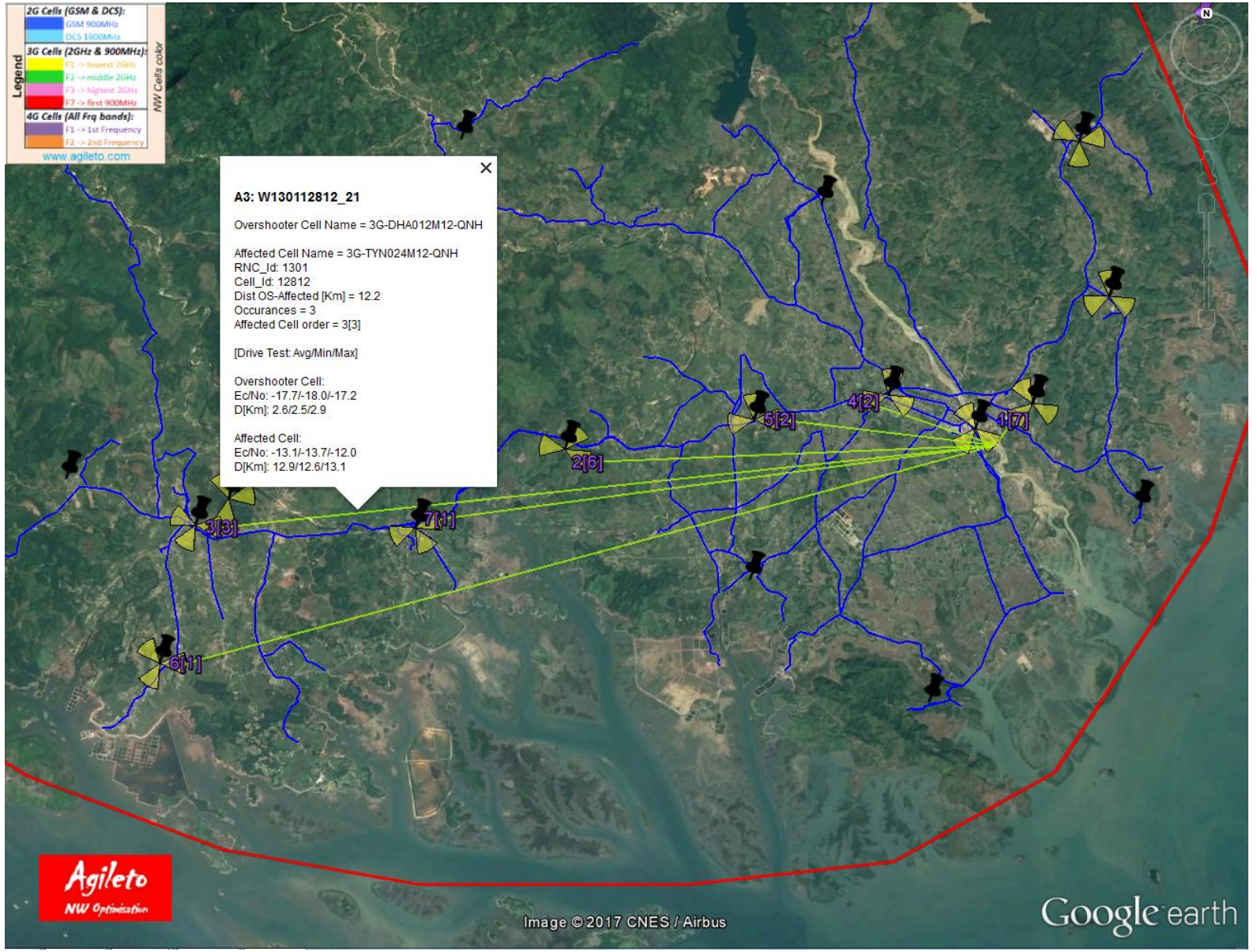
- **Over-shooter cell:**
  3G-DHA012M12-QNH
  (automatically detected by Agileto)

- Nr. of affected cells: **7**

The green lines are links between the overshooter cell and all its affected cells.

At the edge of each line is presented the order of the affected cell per overshooter based on the number of occurrences detected during the drive test.

3G-DHA012M12-QNH
Cell Code = W130110802_21
PSC = 12
UARFCN = 10788
LocalCID = 130110802
Sector_ID = 2
Azimuth = 130
Ant_Height = 30
El_Tilt = 4
Mec_Tilt = 0
Cluster = Cluster_QNH_07
LAC = 13019
RNC_Name = RN1301E
RNC_Id = 1301
Cell_Id = 10802



Missing Neighbors:

1) IntraFq
2) InterFq
3) InterRAT

Neighbors audit and optimization analysis have been performed based on the Drive Test input data and the results have been compared with the neighbors declarations detected into OMC/OSS snapshot/dump files.

The complete neighbor results (Detected/Missing/Not Detected) provided by Agileto tool after post-processing the drive test input data are provided as attachments to this report, as following: IntraFreq: **3G3G_F1F1**, InterFreq: **3G3G_F1F2** + **3G3G_F1F7**, InterRAT: **3G2G_F1GSM**

There are provided as well the Google Earth files containing the neighbors representation where the neighbors results from the tabular format may be visualized in Google Earth environment for supplementary checking if desired (missing neighbors are represented with red).

Supplementary, the simulation movie along the drive test route representing the radio links between each drive test measurement point and all the Cells from ASet is provided (where the missing neighbors are provided with red colors) an it may run in Google Earth (GE) environment as so called “Tour”. If desired, this movie may be accessed in GE and used like an ordinary movie with Play/Pause/FastForward, etc in order to arrive quickly to investigate the desired area around a specific timestamp.

Missing Neighbors detection (automatic)

An example of the **3G3G_F1F1 neighbors** case, detected & generated by Agileto is displayed on the right side, as following:

- Missing neighbors (# 4)
- Detected (Maintained) neighbors (# 9)
- Detected (LI = Low Importance) (# 2)
- Missing LI (Low Importance) (#19)
- Not Detected neighbors (# 6)

Obs.
The optimization results have considered the minimum 'weight' related to the Nr. of occurrences Source-Target as to be > 1%.

All cases which do not meet the 'weight' criteria are provided with 'negative' priority which means NO neighbor proposition.

Source RNC	Source LocalCID	Source CellName	Target RNC	Target LocalCID	Target CellName	Distance Source-Target Cells [Km]	Nr of Occurances	Nr of Occurances [%]	Priority detected	Neighbor status	Existing Cells Source + Target Validatio	Region Cell Source	Region Cell Target
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112523	3G-DHA009M13-QNH	2.05	832	29.68%	1	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112803	3G-DHA010M13-QNH	2.24	491	17.52%	2	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110872	3G-TYN005M12-QNH	7.27	485	17.30%	3	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112492	3G-DHA008M12-QNH	4.32	299	10.67%	4	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112812	3G-TYN024M12-QNH	13.10	108	3.85%	5	Missing	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110902	3G-TYN014M12-QNH	14.10	97	3.46%	6	Missing	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112802	3G-DHA010M12-QNH	2.24	92	3.28%	7	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112921	3G-DHA011M11-QNH	0.00	86	3.07%	8	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112493	3G-DHA008M13-QNH	4.32	56	2.00%	9	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112471	3G-TYN018M11-QNH	9.75	42	1.50%	10	Missing	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112922	3G-DHA011M12-QNH	0.00	38	1.36%	11	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112801	3G-DHA010M11-QNH	2.24	34	1.21%	12	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112472	3G-TYN018M12-QNH	9.75	29	1.03%	13	Missing	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110771	3G-HHA001M11-QNH	4.13	15	0.54%	-14	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112183	3G-MCI007M13-QNH	44.18	12	0.43%	-15	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110252	3G-BLU002M12-QNH	27.17	12	0.43%	-16	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_08
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110533	3G-HHA017M13-QNH	17.91	12	0.43%	-17	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_09
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112433	3G-MCI024M13-QNH	38.65	9	0.32%	-18	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_11
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110802	3G-DHA012M12-QNH	0.97	7	0.25%	-19	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112333	3G-MCI019M13-QNH	41.40	7	0.25%	-20	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110653	3G-MCI048M13-QNH	42.35	7	0.25%	-21	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112453	3G-MCI026M13-QNH	42.98	6	0.21%	-22	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110773	3G-HHA001M13-QNH	4.13	5	0.18%	-23	Detected	Validated	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112413	3G-HHA004M13-QNH	20.16	4	0.14%	-24	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_09
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110351	3G-TYN008M11-QNH	22.26	4	0.14%	-25	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_06
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112202	3G-MCI009M12-QNH	41.69	4	0.14%	-26	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110301	3G-BLU003M11-QNH	27.21	3	0.11%	-27	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_08
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112663	3G-MCI033M13-QNH	40.84	1	0.04%	-28	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_11
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112273	3G-MCI015M13-QNH	44.29	1	0.04%	-29	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112482	3G-TYN019M12-QNH	28.10	1	0.04%	-30	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_06
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110352	3G-TYN008M12-QNH	22.26	1	0.04%	-31	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_06
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112323	3G-MCI018M13-QNH	43.14	1	0.04%	-32	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112643	3G-MCI031M13-QNH	35.01	1	0.04%	-33	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_10
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112153	3G-MCI004M13-QNH	41.87	1	0.04%	-34	Missing LI	Validated	Cluster_QNH_07	Cluster_QNH_12
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112491	3G-DHA008M11-QNH	4.32				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112521	3G-DHA009M11-QNH	2.05				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130112522	3G-DHA009M12-QNH	2.05				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110801	3G-DHA012M11-QNH	0.97				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110803	3G-DHA012M13-QNH	0.97				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07
RN1301E	130112923	3G-DHA011M13-QNH	RN1301E	130110871	3G-TYN005M11-QNH	7.27				NotDetected	Existing	Cluster_QNH_07	Cluster_QNH_07

IntraFr Neighbors optimization (example) -> F1 to F1

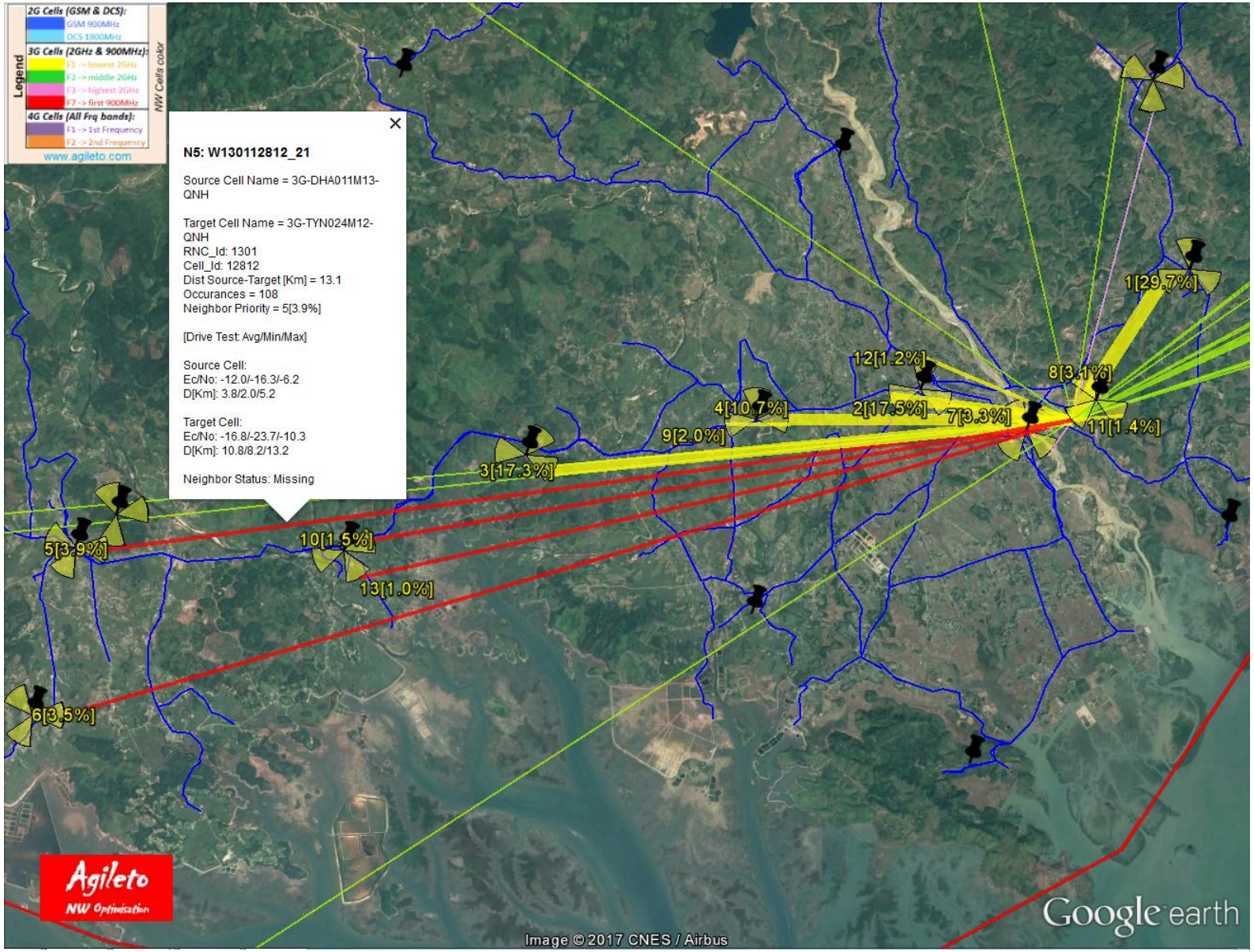
Total missing neighbors
3G3G_F1F1: 61

- The missing neighbors relations are presented with red lines
- The maintained neighbors relations are presented with yellow lines.
- The pink lines are presenting the existing neighbors declarations which are NOT meeting the weight criteria (1%).
- The green lines are presenting potential new neighbors declarations but which do not meet the minimum weight criteria (1% on our case).

Obs. Each neighbor line is presenting at the edge the priority proposal and the relative contribution [%] detected during the drive test.

Example Cell:
3G-DHA011M13-QNH

NB_Proposals: 13
NB_Maintained: 9
NB_Missing: 4
NB_Declared_LI: 2
NB_Missing_LI: 19
NB_Not Detected: 6



InterFr Neighbors optimization (example) -> F1 to F2

Total missing neighbors

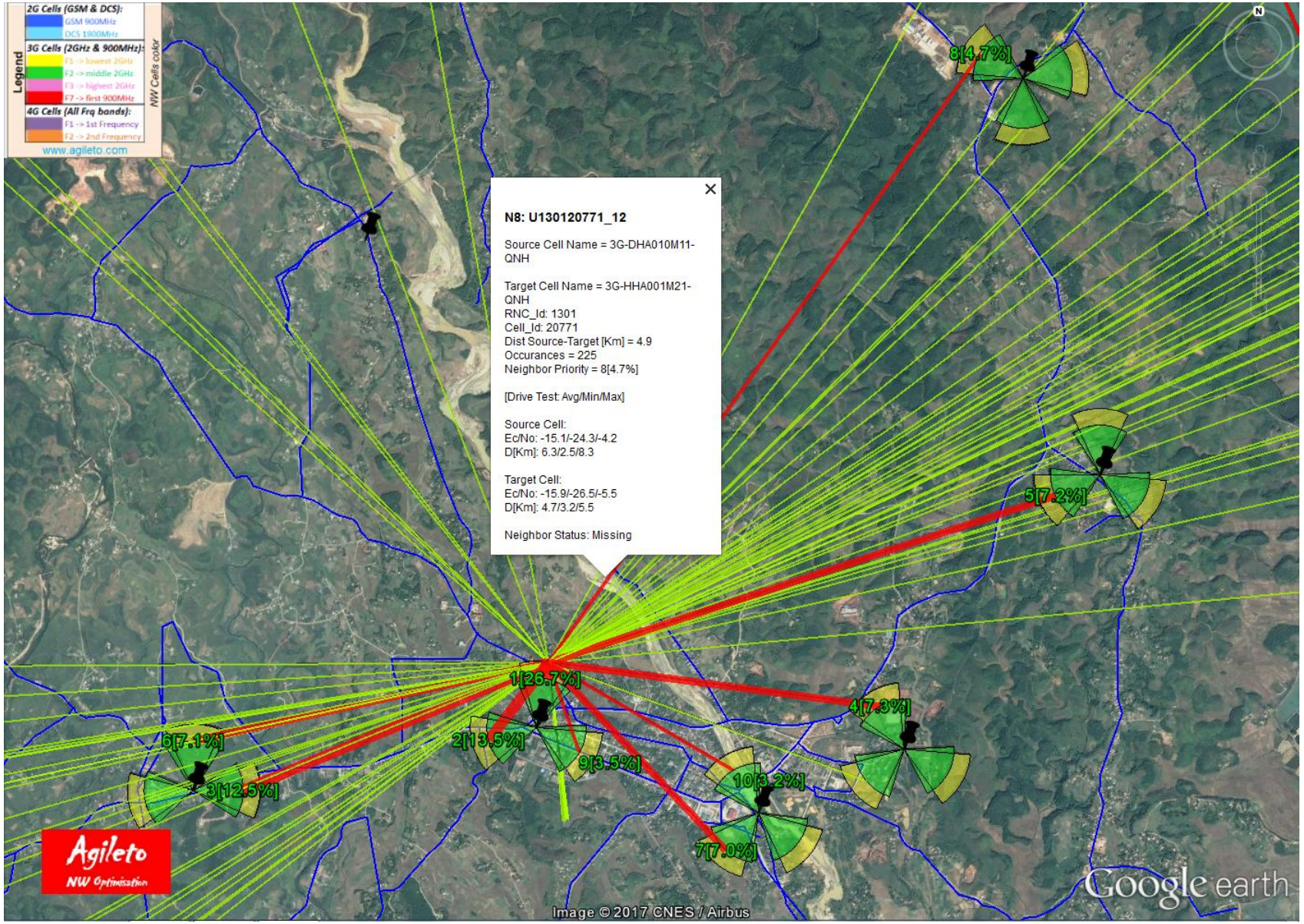
3G3G_F1F2: 310

- The missing neighbors relations are presented with red lines
- The maintained neighbors relations are presented with green lines.
- The pink lines are presenting the existing neighbors declarations which are NOT meeting the weight criteria (1%).
- The light green lines (very thin) are presenting potential new neighbors declarations but which do not meet the minimum weight criteria (1% on our case).

Obs. Each neighbor line is presenting at the edge the priority proposal and the relative contribution [%] detected during the drive test.

Example Cell:

3G-DHA010M11-QNH



NB_Proposals: 10
NB_Maintained: 0
NB_Missing: 10
NB_Declared_LI: 0
NB_Missing_LI: 122
NB_Not Detected: 0

InterFr Neighbors optimization (example) -> F1 to F7

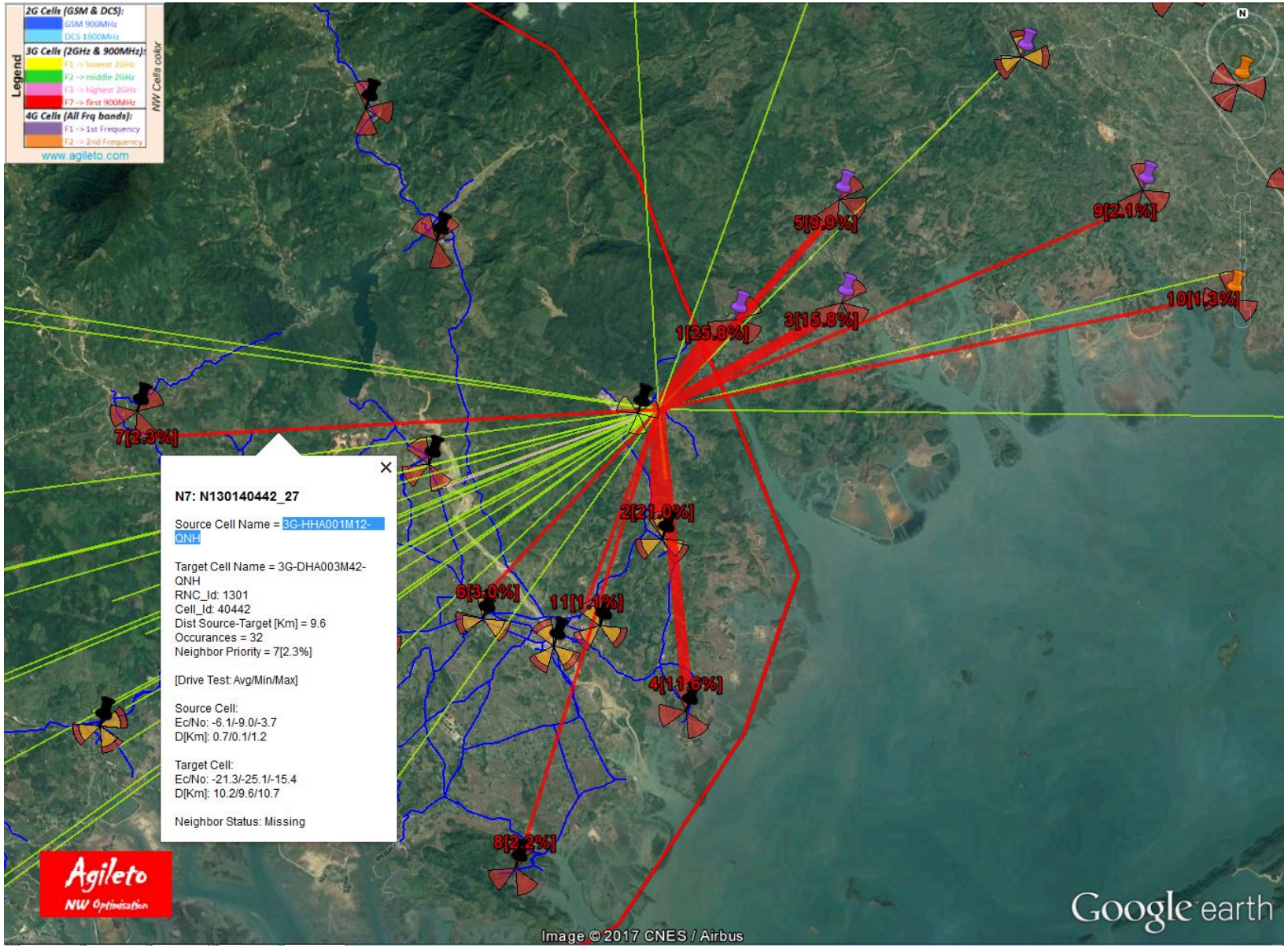
Total missing neighbors
3G3G_F1F7: 53

- The **missing** neighbors relations are presented with **red** lines
- The **maintained** neighbors relations are presented with **brown** lines.
- The **pink** lines are presenting the existing neighbors declarations which are NOT meeting the weight criteria (1%).
- The **green** lines are presenting potential new neighbors declarations but which do not meet the minimum weight criteria (1% on our case).

Obs. Each neighbor line is presenting at the edge the priority proposal and the relative contribution [%] detected during the drive test.

Example Cell:
3G-HHA001M12-QNH

NB_Proposals: 11
NB_Maintained: 5
NB_Missing: 6
NB_Declared_LI: 1
NB_Missing_LI: 36
NB_Not Detected: 8



InterRAT Neighbors optimization (example) -> 3G_F1 to 2G

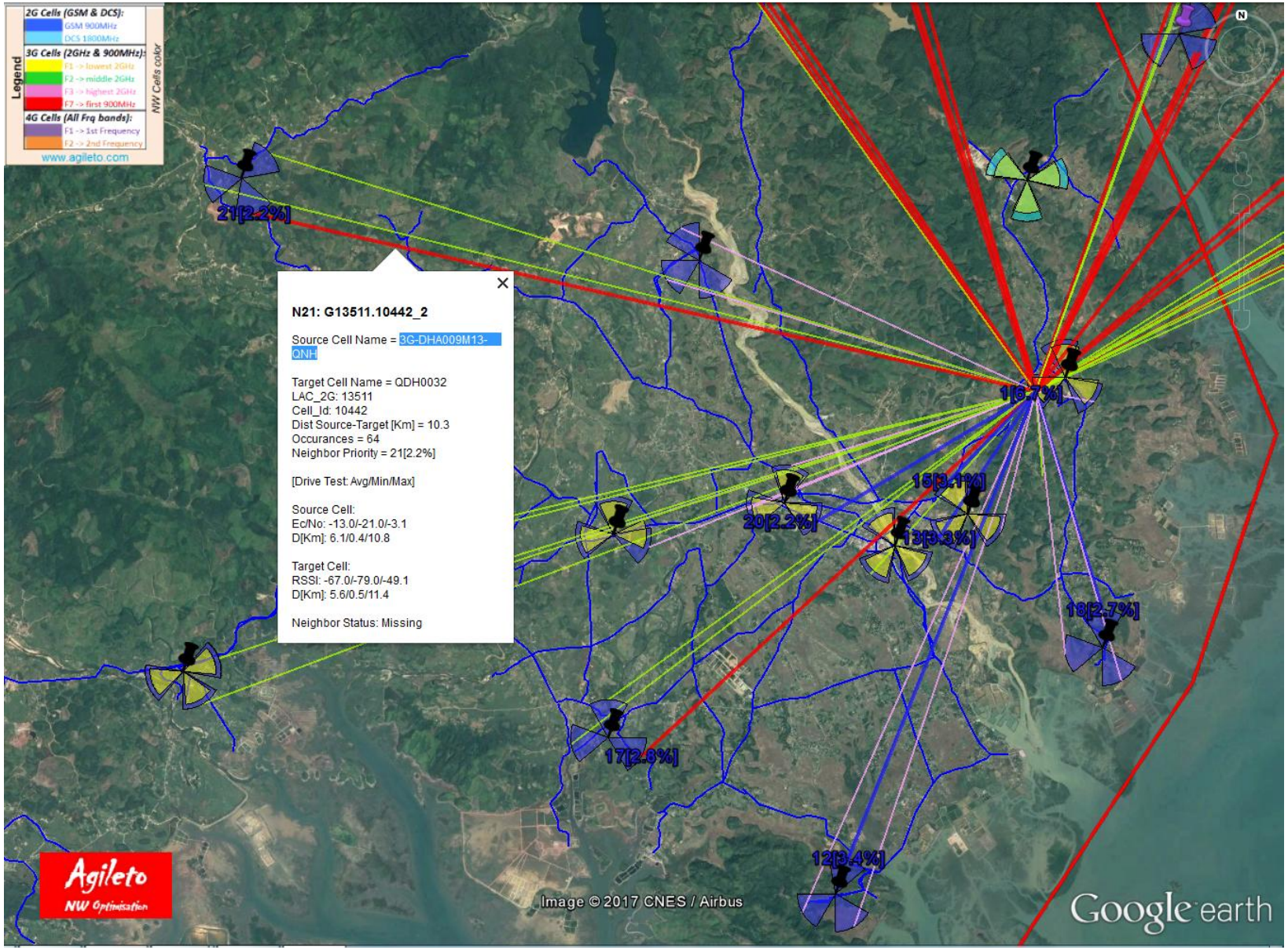
Total missing neighbors

3G2G_F1GSM: 353

- The missing neighbors relations are presented with red lines
- The maintained neighbors relations are presented with blue lines.
- The pink lines are presenting the existing neighbors declarations which are NOT meeting the weight criteria (2%).
- The green lines are presenting potential new neighbors declarations but which do not meet the minimum weight criteria (2% on our case).

Obs. Each neighbor line is presenting at the edge the priority proposal and the relative contribution [%] detected during the drive test.

Example Cell:
3G-DHA009M13-QNH

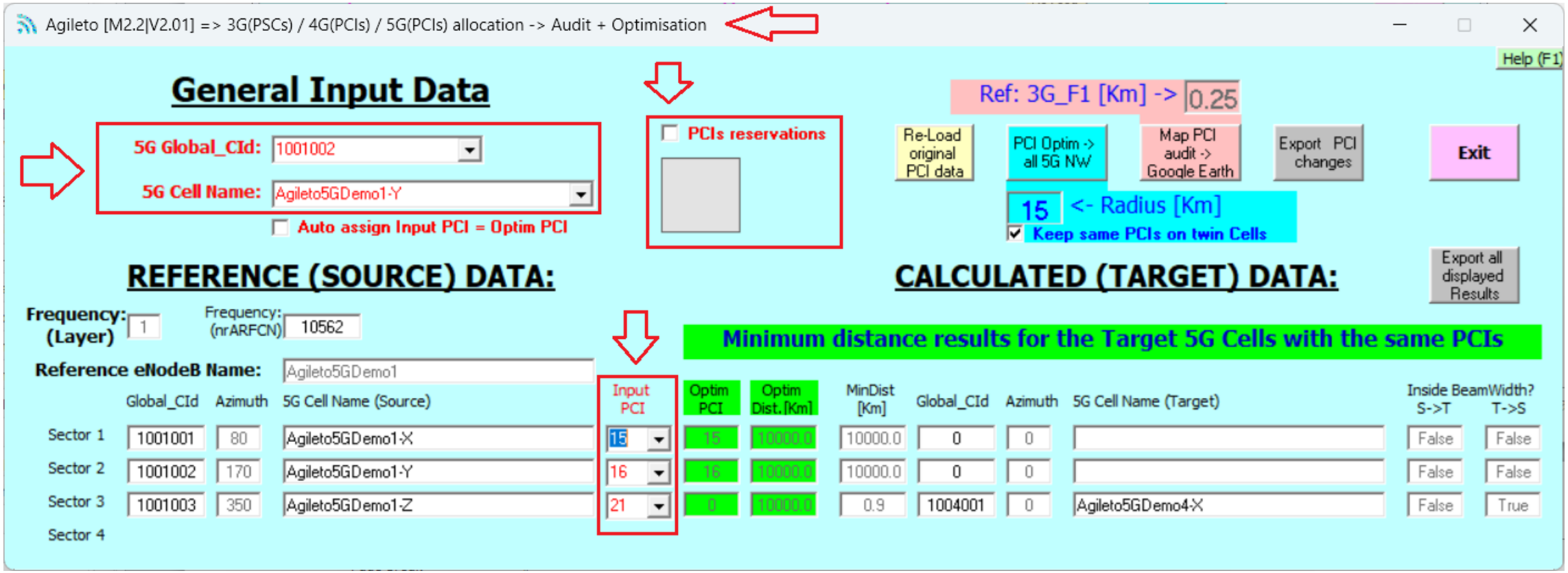


NB_Proposals: 23
NB_Maintained: 7
NB_Missing: 16
NB_Declared_LI: 15
NB_Missing_LI: 22
NB_Not Detected: 6

PSC/PCI Audit & Optimization

PSCs/PCIs Optimization proposal provided by Agileto

Agileto dedicated module (M2.2) provides the optimum change value for the wrong PSCs cases detected during the drive test analysis by providing as input just the Cell Name for the desired 3G Cell which need to change its PSC.



On this section will be presented the cases automatically detected by Agileto as the 'Wrong PSC allocation' during the drive test analysis and there will be provided the new PSCs proposals in order to avoid important interference.

PSC Audit & Optimization provided by Agileto

O	P	Q	R	S	T	U
Same PSC MinDist Opt (InsideBW)	Different PSC	Cell Position	Site Position	Site Priority	Nr Sites inside Radius of 15Km	Inter Sites Distance Avg [Km]
0|0	Yes	1	1	1	9	1.081176
0|0	Yes	2	1	1	9	1.081176
0|0	Yes	3	1	1	9	1.081176
0|0	Yes	37	7	2	9	1.205223
0|0	Yes	38	7	2	9	1.205223
0|0	Yes	39	7	2	9	1.205223
0|0	Yes	16	3	3	9	1.312746

Example of the 3G (PSCs) Allocation and Optimisation at Network level

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Cell_Code	Cluster	RNC Id	NodeB Name	Cell Name [Source]	Local_CId	SectorID [Azimuth]	PSC Ini	Same PSC MinDist Ini (Local_CId)	Same PSC MinDist Ini [Km]	Same PSC MinDist Ini (InsideBW)	PSC Opt	Same PSC MinDist Opt (Local_CI	Same PSC MinDist Opt [Km]	Same PSC MinDist Opt (InsideBW)	Different PSC
6480	F83010540_13		830	NAD054_OT3	NAD054U_OT3	83010540	1 [0]	448	83001021	79.2	0|0	448	83001021	79.2	0|0	No
6481	F83010541_13		830	NAD054_OT3	NAD054V_OT3	83010541	1 [120]	456	83001022	79.2	1|0	456	83001022	79.2	1|0	No
6482	F83010542_13		830	NAD054_OT3	NAD054W_OT3	83010542	1 [240]	464	83001030	77.9	0|0	464	83001030	77.9	0|0	No
6483	F83010550_13		830	NAD055_SR	NAD055U_SR	83010550	1 [361]	88	83019580	0.3	1|0	2	83005050	30.1	0|1	Yes
6484	F83010551_13		830	NAD055_SR	NAD055V_SR	83010551	1 [361]	96	83019581	0.3	1|0	3	83010460	18.1	0|1	Yes
6485	F83010552_13		830	NAD055_SR	NAD055W_SR	83010552	1 [361]	104	83019582	0.3	1|0	4	83020050	65.3	0|0	Yes
10437	Agileto => www.agileto.com © 2017 All rights reserved (support@agileto.com) [M2.2|V1.89] => 3G(PSCs) / 4G(PCIs) allocation -> Audit + Optimisation															
10438	User Login: Agileto | Run Time: 17Sep2017 14:51:24-14:51:59 [35sec]															
10439	Frequency Layer=3, UARFCN=10762															
10440	Note: All 3G Cells declared into MobileNW_Config.xls file (not necessary detected into OMC snapshot) have been used for the calculation															
10441	External PSCs/PCIs reservations list provided: True 80,81,82,83,84,85															

F1 F2 F3 F7

PSCs wrong planning detected & optimized by Agileto

		Cells sharing the same PSC		Cells PSCs to be changed	
Case Number	Common PSC	Cell 1	Cell 2	Cell Change_1	New PSC_1
1	12	3G-DHA012M12-QNH	3G-TYN012M12-QNH	3G-TYN012M12-QNH	333
2	13	3G-DHA012M13-QNH	3G-TYN012M13-QNH	3G-TYN012M13-QNH	334
3	7	3G-TYN012M11-QNH	3G-HHA001M13-QNH	3G-HHA001M13-QNH	320

Above there are presented the cells detected during the drive test analysis with the 'Wrong PSCs planning allocation' meaning that two different cells which share the same PSC may be declared as neighbors to a specific source cell (and therefore a conflict may occur).

Two of the cases displayed on the right side are presented in Google Earth environment (furthermore on this section) where the cells detected in conflict by sharing the same PSC are linked together with a red line while each one is linked by the source cell with a yellow line.

The entire table presented on the right side (*.xls) together with the Google Earth package presenting the "WrongPlanPSC" detected during the drive test are attached to this report for the future reference.

On the right side there are presented the PSC changes proposals for the selected cells (detected to have PSC in conflict) after using Agileto module M2.2 by getting the new optimum PSCs values. => Total = 3 PSCs changes.

Wrong PSC allocation detection & optimisation

Case of wrong PSC detected:

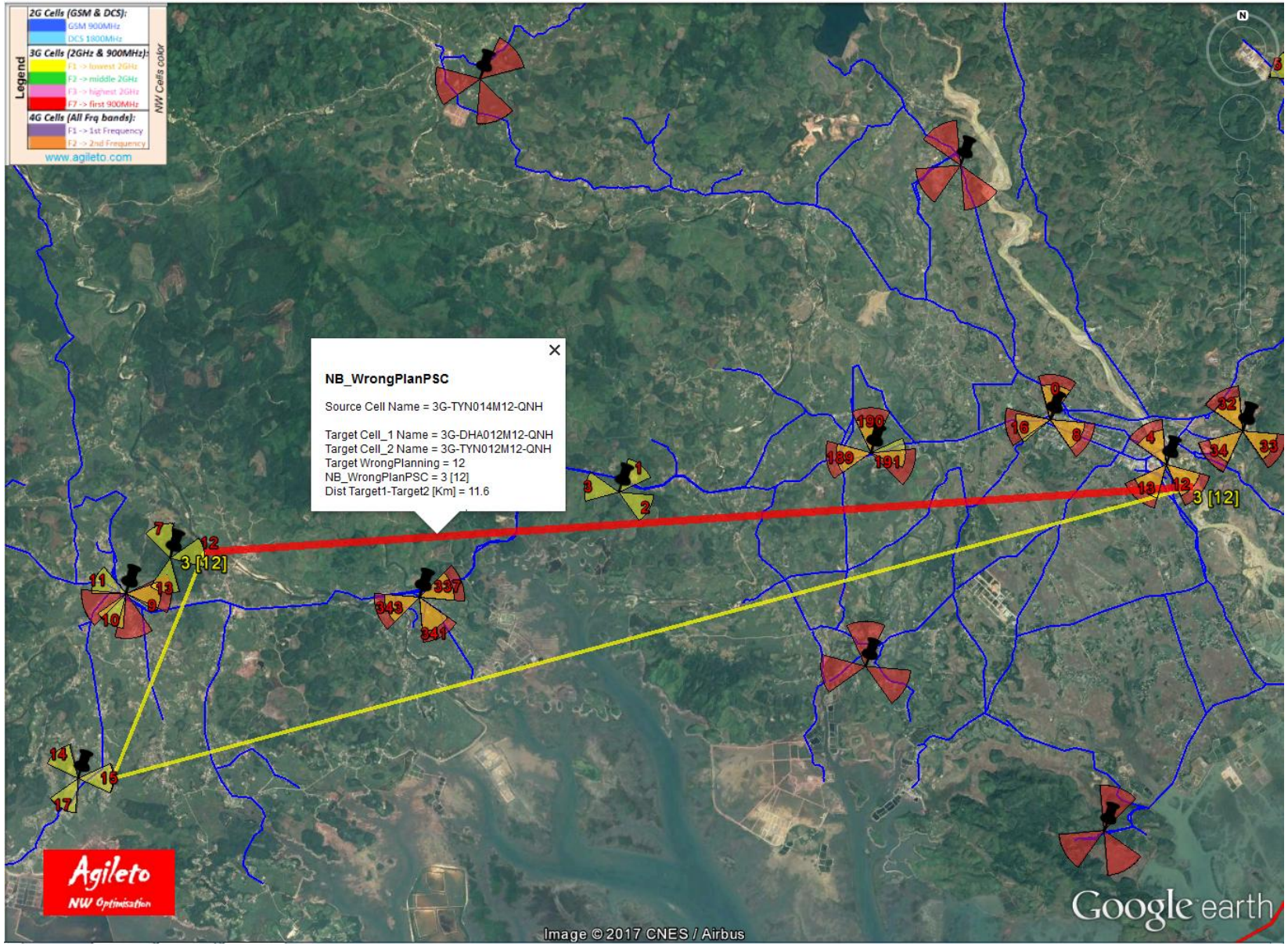
PSC = 12

Two cells are sharing the same PSC:
Cell 1: 3G-DHA012M12-QNH
Cell 2: 3G-TYN012M12-QNH

Due to the negative impact on the network performance it is recommended to change the PSC for one cell in order to avoid possible interference which may degrade important KPIs like CSSR and/or CDR.

Based on Agileto module M2.2 we get the optimum new PSC value:

Cell change: 3G-TYN012M12-QNH
New PSC: 333



Wrong PSC allocation detection & optimisation

Case of wrong PSC detected:

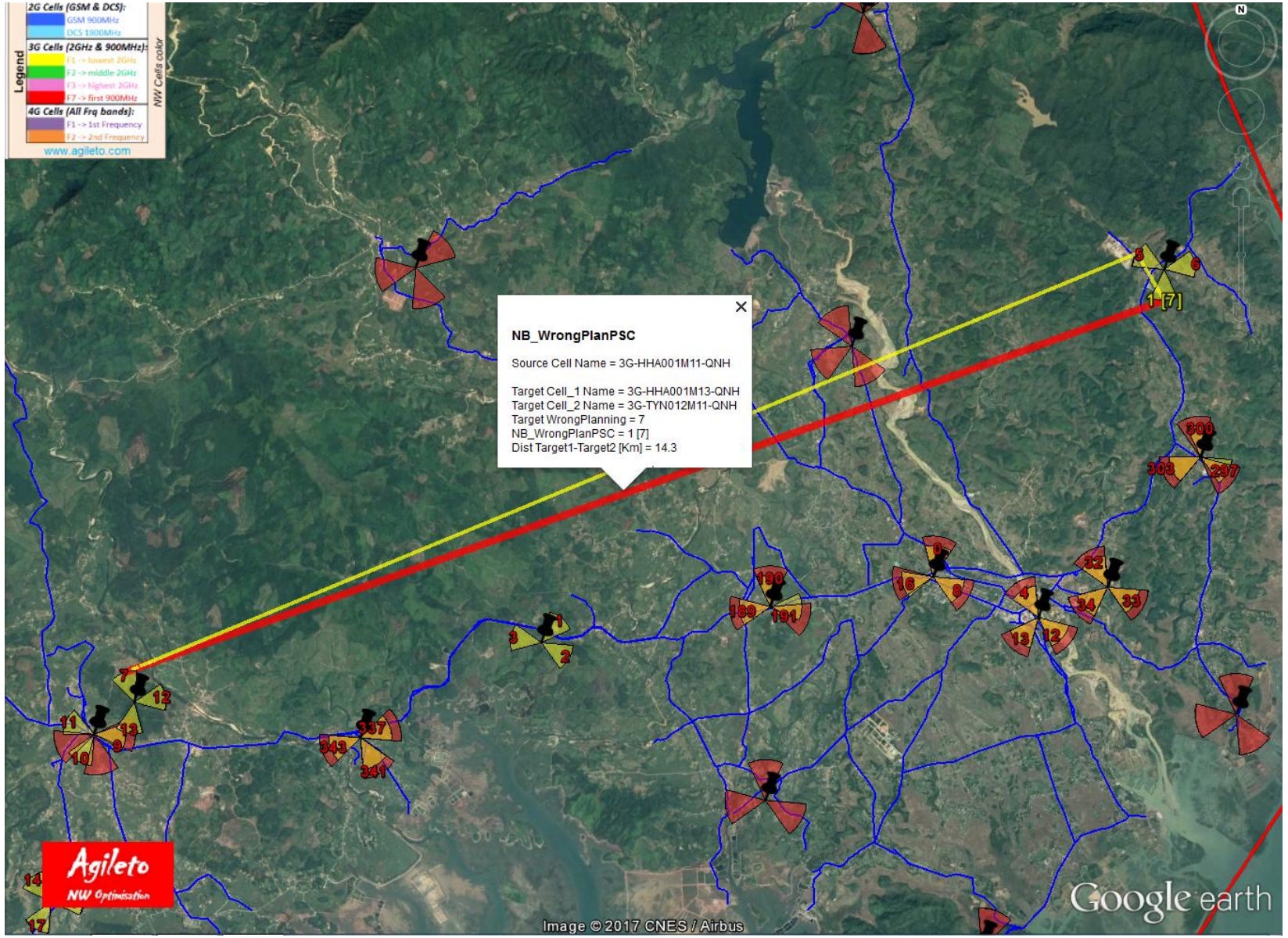
PSC = 7

Two cells are sharing the same PSC:
Cell 1: 3G-HHA001M13-QNH
Cell 2: 3G-TYN012M11-QNH

Due to the negative impact on the network performance it is recommended to change the PSC for one cell in order to avoid possible interference which may degrade important KPIs like CSSR and/or CDR.

Based on Agileto module M2.2 we get the optimum new PSC value:

Cell change: 3G-HHA001M13-QNH
New PSC: 320



Cross Feeders Detection

Automatic cross feeders detection

After processing the drive test (DT) input data Agileto tool provides automatically analysis regarding the cross sectors/feeders detection based on the following elements:

- Cells geographically position (Lat/Long);
- Cells antennae's azimuth;
- DT Measurement point positions (Lat/Long) where the cells has been detected.

Based on automatically analysis there are detected how many points [%] are detected inside the antennae's beamwidth (Good) and how many points are detected outside (Bad). If the nr. of 'Bad' points is greater than the nr. of 'Good' points it is flagged like having a Cross Sector (TRUE). This analysis is performed for two cases representing the situations where the cell was detected in **Full** coverage and the situations where the cell was detected as **Top1**.

On the right side it is presented this output table concerning the '**CrossSector**' analysis where are emphasized with red color two sites which will be presented in details on the next slides by presenting their full coverage points for each sector.

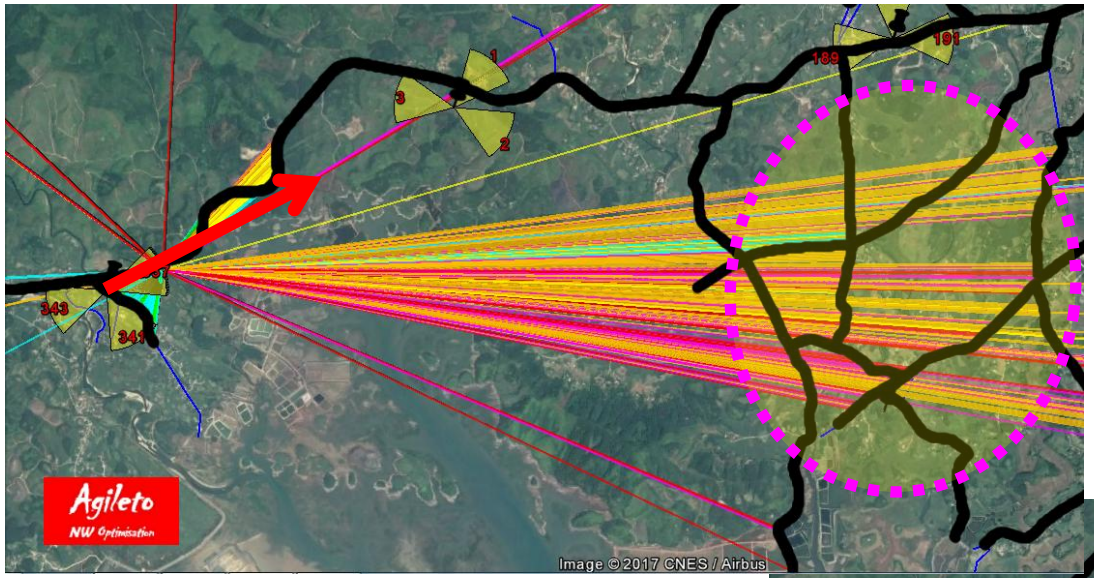
Site: **SR-TYN018M-QNH** => To be verified the Sectors 1 and 2.

Cell_Name	Azimuth	Cvg All Pts	Cvg PtsGood [%]	Cvg PtsBad [%]	CrossSector CvgAll	Top1 Pts	Top1 PtsGood [%]	Top PtsBad [%]	CrossSector Top1
3G-DHA011M12-QNH	120	738	82.38	17.62	FALSE	449	100	0	FALSE
3G-DHA011M13-QNH	230	4029	94.61	5.39	FALSE	2689	98.92	1.08	FALSE
3G-TYN018M11-QNH	70	909	86.58	13.42	FALSE	55	63.64	36.36	FALSE
3G-TYN018M12-QNH	150	841	32.46	67.54	TRUE	229	20.96	79.04	TRUE
3G-TYN018M13-QNH	250	684	84.94	15.06	FALSE	278	98.56	1.44	FALSE
3G-TYN024M11-QNH	295	1109	88.82	11.18	FALSE	475	100	0	FALSE
3G-TYN024M12-QNH	95	1295	93.13	6.87	FALSE	149	98.66	1.34	FALSE
3G-TYN024M13-QNH	210	804	62.19	37.81	FALSE	144	97.92	2.08	FALSE
3G-DHA008M11-QNH	0	1450	90.62	9.38	FALSE	513	97.66	2.34	FALSE
3G-DHA008M12-QNH	90	3094	68.78	31.22	FALSE	521	96.35	3.65	FALSE
3G-DHA008M13-QNH	260	1624	54.37	45.63	FALSE	612	72.55	27.45	FALSE
3G-HHA001M11-QNH	300	3199	88.34	11.66	FALSE	2103	98.38	1.62	FALSE
3G-HHA001M12-QNH	80	463	87.26	12.74	FALSE	397	98.49	1.51	FALSE
3G-HHA001M13-QNH	180	933	77.17	22.83	FALSE	227	98.24	1.76	FALSE
3G-TYN005M11-QNH	40	1151	90.1	9.9	FALSE	131	94.66	5.34	FALSE
3G-TYN005M12-QNH	120	2810	96.58	3.42	FALSE	1031	100	0	FALSE
3G-TYN005M13-QNH	280	514	91.25	8.75	FALSE	242	100	0	FALSE
3G-TYN012M11-QNH	340	1321	74.41	25.59	FALSE	816	94.49	5.51	FALSE
3G-TYN012M12-QNH	80	397	58.94	41.06	FALSE	31	100	0	FALSE
3G-TYN012M13-QNH	190	922	81.13	18.87	FALSE	405	90.12	9.88	FALSE
3G-TYN014M11-QNH	320	1490	93.96	6.04	FALSE	711	99.86	0.14	FALSE
3G-TYN014M12-QNH	90	1077	88.77	11.23	FALSE	498	97.39	2.61	FALSE
3G-TYN014M13-QNH	210	178	84.83	15.17	FALSE	151	100	0	FALSE
3G-DHA009M11-QNH	0	665	77.14	22.86	FALSE	206	81.55	18.45	FALSE
3G-DHA009M12-QNH	120	267	80.52	19.48	FALSE	130	96.15	3.85	FALSE
3G-DHA009M13-QNH	245	4431	92.24	7.76	FALSE	330	83.03	16.97	FALSE
3G-DHA012M11-QNH	330	1	100	0	FALSE	0			FALSE
3G-DHA012M12-QNH	130	37	48.65	51.35	TRUE	0			FALSE
3G-DHA012M13-QNH	220	4	100	0	FALSE	0			FALSE

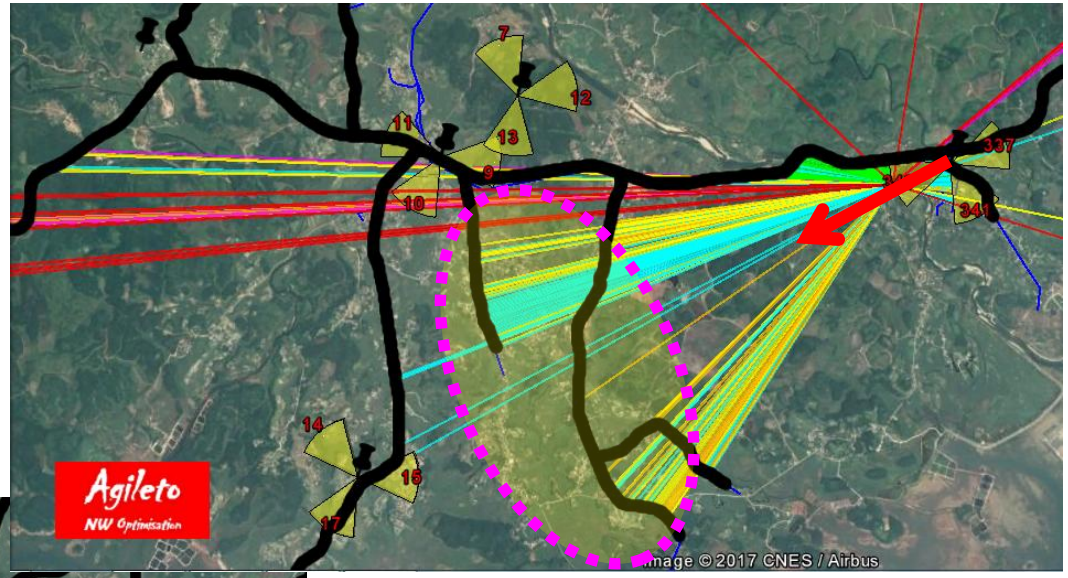
Automatic cross feeders detection

Site: **SR-TYN018M-QNH**

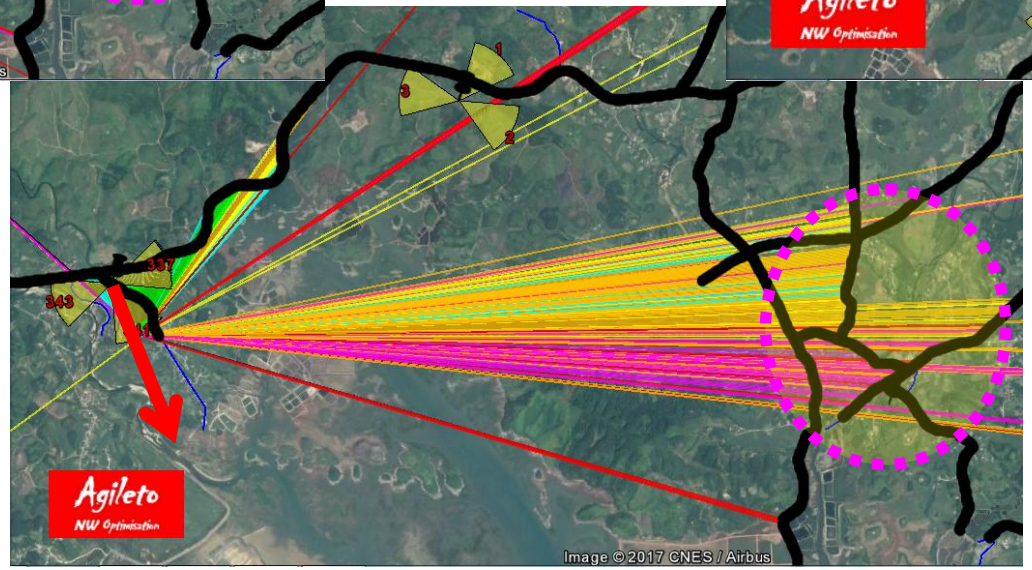
Sector 1



Sector 3



Sector 2



<u>Obs:</u>

There is almost no coverage difference between the sectors 1 and 2 ?!

Thank you

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