<center>

APPENDIX A

Mobile Speed Test Data Specification

</center>

1.   Overview

The Alaska Plan requires certain plan participants to conduct and report speed tests of their networks, as described in this Order and appendices. Appendix A describes the data to be collected and the format in which it is to be reported.

2.   Sample Data

```json
{
 "submission_type": "Alaska Plan",
 "submissions": [
  {
   "test_id": "1599236609",
   "device_type": "Android",
   "manufacturer": "Google",
   "model": "PIXEL 6",
   "operating_system": "Android 12",
   "device_tac": "35142059",
   "app_name": "FCC Speed Test app",
   "app_version": "2.0.4058",
   "provider_name": "GCI",
   "tests": {
    "download": {
     "timestamp": "2021-07-08T09:02:42-08:00",
     "warmup_duration": 3000622,
     "warmup_bytes_transferred": 31900808,
     "duration": 4997185,
     "bytes_transferred": 97382448,
     "bytes_sec": 19487461,
     "locations": [
      {
       "timestamp": "2021-07-08T09:02:42-08:00",
       "latitude": 63.069168,
       "longitude": -153.248195
      },
      {
       "timestamp": "2021-07-08T09:02:47-08:00",
       "latitude": 63.069168,
       "longitude": -153.248195
      }
     ],
     "cells": [
      {
       "cell_id": 32193025,
       "physical_cell_id": 192,
       "cell_connection": 1,
       "network_generation": "4G",
       "network_subtype": "LTE",
       "rssi": -77.1,
       "rsrp": -95.2,
       "rsrq": -16.5,
       "sinr": 11.9,
       "ec_io": -8.3,
       "rcsp": -84.2,
       "cqi": 10,
       "spectrum_band": 66,
```

```
          "spectrum_bandwidth": 20,
          "arfcn": 66786
        },
        {
          "cell_id": 10283265,
          "physical_cell_id": 101,
          "cell_connection": 2,
          "network_generation": "4G",
          "network_subtype": "LTE",
          "rssi": -77.1,
          "rsrp": -97.2,
          "rsrq": -10.1,
          "sinr": 21.2,
          "ec_io": -8.3,
          "rcsp": -84.2,
          "cqi": 10,
          "spectrum_band": 71,
          "spectrum_bandwidth": 15,
          "arfcn": 68686
        }
      ],
      "success_flag": true
    },
    "upload": {
      "timestamp": "2021-07-08T09:02:51-08:00",
      "warmup_duration": 3000213,
      "warmup_bytes_transferred": 8337402,
      "duration": 5000085,
      "bytes_transferred": 15129062,
      "bytes_sec": 3025761,
      "locations": [
        {
          "timestamp": "2021-07-08T09:02:51-08:00",
          "latitude": 63.069168,
          "longitude": -153.248195
        },
        {
          "timestamp": "2021-07-08T09:02:56-08:00",
          "latitude": 63.069168,
          "longitude": -153.248195
        }
      ],
      "cells": [
        {
          "cell_id": 32193025,
          "physical_cell_id": 192,
          "cell_connection": 1,
          "network_generation": "4G",
          "network_subtype": "LTE",
          "rssi": -77.1,
          "rsrp": -96.2,
          "rsrq": -9.1,
          "sinr": 10.5,
          "ec_io": -8.3,
          "rcsp": -84.2,
          "cqi": 10,
          "spectrum_band": 66,
          "spectrum_bandwidth": 20,
          "arfcn": 66786
        },
        {
          "cell_id": 35988099,
          "physical_cell_id": 192,
```

```
                "cell_connection": 2,
                "network_generation": "4G",
                "network_subtype": "LTE",
                "rssi": -71.1,
                "rsrp": -99.1,
                "rsrq": -6.9,
                "sinr": 9.7,
                "ec_io": -8.3,
                "rcsp": -84.2,
                "cqi": 10,
                "spectrum_band": 41,
                "spectrum_bandwidth":  20,
                "arfcn": 39874
              }
          ],
           "success_flag":  true
         }
        }
       }
      }
     ]
    }
```

3. Mobile Speed Test Data

This section details the data structure common for all mobile speed test data in the Alaska Plan. This file contains records of each mobile speed test in JavaScript Object Notation (JSON) format matching the specification in the table and sections below:

Field	Data Type	Example	Description / Notes
submission_type	Enumerated	Alaska Plan	Type of data submission. *- Value must be "Alaska Plan".*
submissions	Array [Submission Object]		List of drive-test data submissions. *Note: the specification for the Submission Object is described in **Section a**.*

a. Submission Object

Field	Data Type	Example	Description / Notes
test_id	String	1599236609	Unique identifier used by the app or entity to differentiate tests. *- Value must be unique across all data submitted by the same entity.*
device_type	Enumerated	Android	Type of device. *- Value must be one of the following:* *{iOS|Android|Other}*
manufacturer	String	Google	Name of the device manufacturer.
model	String	PIXEL 6	Name of the device model.
operating_system	String	Android 12	Name and version of the device operating system.

Field	Data Type	Example	Description / Notes
device_tac	String	35142059	8-digit Type Allocation Code of the device. *- Value is not available on iOS and may be null for these device types.* *- Value may be null if the device does not return a valid value or else returns a value of unknown.*
app_name	String	FCC Speed Test app	Name of the mobile speed test app.
app_version	String	2.0.4058	Version of the mobile speed test app.
provider_name	String	GCI	Name of the mobile service provider.
tests	Test Object		Information about the test metrics. *Note: the specification for the Test Object is described in **Section b**.*

b.   Test Object

Field	Data Type	Example	Description / Notes
download	Download Test Object		Information about the download test metric. *Note: this object is only required for 3G, 4G LTE, and 5G-NR network generation speed tests and would be omitted for 2G network generation voice tests.* *Note: the specification for the Download Test Object is described in **Section c**.*
upload	Upload Test Object		Information about the upload test metric. *Note: this object is only required for 3G, 4G LTE, and 5G-NR network generation speed tests and would be omitted for 2G network generation voice tests.* *Note: the specification for the Upload Test Object is described in **Section d**.*
voice_ terminating	Mobile Terminating Voice Test Object		Information about the mobile terminating voice test metric. *Note: this object is only required for 2G network generation voice tests and would be omitted for 3G, 4G LTE, and 5G-NR speed tests.* *Note: the specification for the Mobile Terminating Voice Test Object is described in **Section e**.*

Field	Data Type	Example	Description / Notes
voice_ originating	Mobile Originating Voice Test Object		Information about the mobile originating voice test metric. *Note: this object is only required for 2G network generation voice tests and would be omitted for 3G, 4G LTE, and 5G-NR speed tests.* *Note: the specification for the Mobile Originating Voice Test Object is described in **Section f**.*

c. Download Test Object

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:42-08:00	Timestamp of the time at which the test metric commenced. *- Value must match valid ISO-8601 format, including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
warmup_ duration	Integer	3000622	Duration in microseconds that connection took to stabilize (e.g., TCP slow start) before the test metric commenced.
warmup_bytes_ transferred	Integer	31900808	Measured total amount of data in bytes that were transferred during the period the connection took to stabilize (e.g., TCP slow start) before the test metric commenced.
duration	Integer	4997185	Duration that the test metric took to complete in microseconds.
bytes_transferred	Integer	97382448	Measured total amount of data in bytes that the test metric transferred.
bytes_sec	Integer	19487461	Measured number of bytes per second that the test metric transferred.
locations	Array [Location Object]		List of geographic coordinates of the locations measured during the speed test. *Note: the specification for each Location Object element is described in **Section g**.*
cells	Array [Cell Object]		List of cellular telephony information measured during the speed test. *Note: the specification for each Cell Object element is described in **Section h**.*
success_flag	Boolean	true	Boolean flag indicating whether the test completed successfully and without a change in state or connectivity.

d. Upload Test Object

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:51-08:00	Timestamp of the time at which the test metric commenced. *- Value must match valid ISO-8601 format, including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
warmup_ duration	Integer	3000213	Duration in microseconds that connection took to stabilize (e.g., TCP slow start) before the test metric commenced.
warmup_bytes_ transferred	Integer	8337402	Measured total amount of data in bytes that were transferred during the period the connection took to stabilize (e.g., TCP slow start) before the test metric commenced.
duration	Integer	5000085	Duration that the test metric took to complete in microseconds.
bytes_transferred	Integer	15129062	Measured total amount of data in bytes that the test metric transferred.
bytes_sec	Integer	3025761	Measured number of bytes per second that the test metric transferred.
locations	Array [Location Object]		List of geographic coordinates of the locations measured during the speed test. *Note: the specification for each Location Object element is described in **Section g**.*
cells	Array [Cell Object]		List of cellular telephony information measured during the speed test. *Note: the specification for each Cell Object element is described in **Section h**.*
success_flag	Boolean	true	Boolean flag indicating whether the test completed successfully and without a change in state or connectivity.

e. Mobile Terminating Voice Test Object

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:42-08:00	Timestamp of the time at which the test metric commenced. *- Value must match valid ISO-8601 format, including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
duration	Integer	2001681	Duration that the test metric took to complete in microseconds. *- Value must be between 5000000 and 30000000 (i.e., between 5 and 30 seconds).*

Field	Data Type	Example	Description / Notes
locations	Array [Location Objects]		List of geographic coordinates of the location(s) measured during the test. *Note: the specification for each Location Object element is described in Section g.*
cells	Array [Cell Objects]		List of cellular telephony information measured during the test. *Note: the specification for each Cell Object element is described in Section h.*
success_flag	Boolean	true	Boolean flag indicating whether the test completed successfully and without a change in state or connectivity.

f. Mobile Originating Voice Test Object

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:42-08:00	Timestamp of the time at which the test metric commenced. *- Value must match valid ISO-8601 format, including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
duration	Integer	2005309	Duration that the test metric took to complete in microseconds. *- Value must be between 5000000 and 30000000 (i.e., between 5 and 30 seconds).*
locations	Array [Location Objects]		List of geographic coordinates of the location(s) measured during the test. *Note: the specification for each Location Object element is described in Section g.*
cells	Array [Cell Objects]		List of cellular telephony information measured during the test. *Note: the specification for each Cell Object element is described in Section h.*
success_flag	Boolean	true	Boolean flag indicating whether the test completed successfully and without a change in state or connectivity.

g. Location Objects

Each element of the "locations" array contains the geographic coordinates of the locations measured at the start and end of the speed test, as well as during the test (if measured).

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:58-08:00	Timestamp of the time at which the location was recorded. *- Value must match valid ISO-8601 format, including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
latitude	Numeric	63.069168	Unprojected (WGS-84) geographic coordinate latitude in decimal degrees of the reported location where the test was conducted. *- Value must have minimum precision of 6 decimal places.*
longitude	Numeric	-153.248195	Unprojected (WGS-84) geographic coordinate longitude in decimal degrees of the reported location where the test was conducted. *- Value must have minimum precision of 6 decimal places.*

h. Cell Objects

Each element of the "cells" array contains telephony information about the cell / carrier.

Field	Data Type	Example	Description / Notes
timestamp	Datetime	2021-07-08T09:02:42-08:00	Timestamp of the time at which the cell information was measured. *- Value must match valid ISO-8601 format including seconds and timezone offset, i.e.: YYYY-MM-DD[T]hh:mm:ss±hh:mm*
cell_id	Numeric	32193025	Measured cell identifier. *- Value is not available on iOS and may be null for these device types.*
physical_cell_id	Integer	192	Measured Physical Cell Identity (PCI) of the cell. *- Value is not available on iOS and may be null for these device types.* *- Value is only required for 4G LTE and 5G-NR tests and must be null for 2G or 3G tests.*

Field	Data Type	Example	Description / Notes
cell_connection	Enumerated	1	Connection status of the cell. - *Value must be one of the following codes:* *0 – Not Serving* *1 – Primary Serving* *2 – Secondary Serving* - *Value is not available on iOS and may be null for these device types.* - *Value may be null if the device does not return a valid value or else returns a value of unknown.*
network_ generation	Enumerated	4G	String representing the network generation of the cell. - *Value must be one of the following:* *{2G|3G|4G|5G|Other}*
network_subtype	Enumerated	LTE	String representing the network subtype of the cell. - *Value must be one of the following:* *{1X|EVDO|WCDMA|GSM|HSPA|HSPA+| LTE|NRSA|NRNSA}*
rssi	Decimal	-57.2	Measured Received Signal Strength Indication (RSSI) in dBm of the cell. - *Value is not available on iOS and may be null for these device types.* - *Value is required for all network generations and subtypes.*
rxlev	Decimal	-80.2	Measured Received Signal Level in dBm of the cell. - *Value is not available on iOS and may be null for these device types.* - *Value is only required for tests with a network generation and subtype of 2G – GSM, and must be null for all other network generations or subtypes.*
rsrp	Decimal	-92.1	Measured Reference Signal Received Power (RSRP) in dBm of the cell. - *Value is not available on iOS and may be null for these device types.* - *Value must be null for 2G or 3G tests.* - *Note: this value represents the Synchronization Signal (SS) for 5G-NR tests and the Channel-specific Reference Signal (CRS) for 4G LTE tests.*

Field	Data Type	Example	Description / Notes
rsrq	Decimal	-12.5	Measured Reference Signal Received Quality (RSRQ) in dB of the cell. *- Value must be null for 2G or 3G tests.* *- Note: this value represents the Synchronization Signal (SS) for 5G-NR tests and the Channel-specific Reference Signal (CRS) for 4G LTE tests.*
sinr	Decimal	21.3	Measured Signal to Interference and Noise Ratio (SINR) in dB of the cell. *- Value is not available on iOS and may be null for these device types.* *- Value may be null for 2G or 3G tests.* *- Note: this value represents the Synchronization Signal (SS) for 5G-NR tests and the Channel-specific Reference Signal (CRS) for 4G LTE tests.*
rxqual	Integer	3	Measured Received Signal Quality of the cell *- Value is not available on iOS and may be null for these device types.* *- Value must be between 0 and 7.* *- Value is only required for tests with a network generation of 2G and network subtype of GSM, and must be null for all other network generations or network subtypes.*
ec_io	Decimal	-8.3	Measured Energy per Chip to Interference Power Ratio in dB of the cell. *- Value is not available on iOS and may be null for these device types.* *- Value is only required for CDMA 1X, EVDO, WCDMA, HSPA, and HSPA+ network subtypes, and must be null for all other network subtypes.*
rscp	Decimal	-87.2	Measured Received Signal Code Power in dBm of the cell. *- Value is not available on iOS and may be null for these device types.* *- Value is only required for WCDMA, HSPA, and HSPA+ network subtypes, and may be null for all other network subtypes.*

Field	Data Type	Example	Description / Notes
cqi	Integer	11	Measured Channel Quality Indicator (CQI) of the cell. - *Value is not available on iOS and may be null for these device types.* - *Value is only required for WCDMA, HSPA, HSPA+, LTE, and NR network subtypes, and may be null for all other network subtypes.*
spectrum_band	Integer	66	Spectrum band used by the cell. - *Value is not available on iOS and may be null for these device types.* - *Value may be null for 2G or 3G tests.* - *Value may be null if the device does not return a valid value or else returns a value of unknown.* - *Note: the reported band value corresponds to the Operating Bands tables as follows:* - *4G LTE: 3GPP TS 36.101 section 5.5* - *5G-NR: 3GPP TS 38.101 table 5.2-1*
spectrum_bandwidth	Numeric	15	Total amount of spectral bandwidth used by the cell in MHz. - *Value is not available on iOS and may be null for these device types.*
arfcn	Integer	66786	Absolute radio-frequency channel number, measured absolute physical RF channel number of the cell. - *Value is not available on iOS and may be null for these device types.*