

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Cal. Due |
|--------------------------------|---------------------------|----------------|------|------------|------------|
| Thermometer | Omega Engineering, Inc. | HH311 | DUI | 2021-02-02 | 2024-02-02 |
| Meter - Multimeter | Fluke | 77 IV | MLT | 2020-10-15 | 2023-10-15 |
| Spectrum Analyzer | Keysight | N9020A | R316 | 2021-08-19 | 2023-08-19 |
| Chamber - Temperature/Humidity | Cincinnati Sub Zero (CSZ) | ZPH-8-2-SCT/AC | TBH | NCR | NCR |

TEST DESCRIPTION

The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Measurements were made on the single transmit frequency as called out on the data sheets. Testing was done while the EUT was continuously operating.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage while at ambient temperature. Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range of -30 $^{\circ}$ to +50 $^{\circ}$ C and at 10 $^{\circ}$ C intervals.

FCC Part 27.54 defines the frequency deviation limit as follows: "The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation."

FCC Part 24.235 defines the frequency deviation limit as follows: "The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block" RSS 133 6.3 frequency stability requirement for base stations is 1.0 ppm. In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS Gen. RSS-139 6.4 and RSS-170 5.2 defines frequency stability as follows: "The frequency stability shall be sufficient to ensure

that the occupied/emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen".

Results with a frequency error of less than 1000 Hz will show the carrier to be operating within the band. The frequency stability/accuracy radio design is the same for all radio technologies and modulation types. The radio was configured for 4G LTE to show compliance.



| Carial Numbers V | HFII Remote Radio Hea | d | | | | Work Order: | NOKI0037 | |
|--|------------------------|--|-------------------|----------------------------|---------------------------|-----------------------------|---------------------|--------------|
| Serial Number: T | K214000036 | | | | | Date: 1 | 8-Mar-22 | |
| Customer: N | okia Solutions and Net | works | | | | Temperature: | 2.6 °C | |
| Attendees: D | avid Le, John Rattanav | ong | | | | Humidity: 2 | 23.7% RH | |
| Project: N | one | | | | | Barometric Pres.: | 026 mbar | |
| Tested by: M | larty Martin | | Powe | r: 48 VDC | | Job Site: | TX05 | |
| ST SPECIFICATION | NS | | | Test Method | | | | |
| CC 24E:2022 | | | | ANSI C63.26:2015 | | | | |
| SS-133 Issue 6:2013 | 3+A1:2018 | | | RSS-133 Issue 6:2013 | A1:2018 | | | |
| OMMENTS | | | | | | | | |
| I measurement path inutes) prior to mea | | d for in the reference level offest incl | uding any attenua | itors, filters and DC bloc | ks. The EUT temperature v | vas stabilized at each temp | erature step (for a | a minimum of |
| VIATIONS FROM T | TEST STANDARD | | | | | | | |
| one | | | | | | | | |
| onfiguration # | 6 | Signature | Marti | | | | | |
| | | | | | | Absolute Value | Limit | |
| | | | | | | Frequency ∆ (Hz) | Δ (Hz) | Result |
| | | -30°C Temperature Conditions Mid CHannel 1962.5 MHz | | | | 4.85 | 1000 | Pass |
| | | -20°C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 5.78 | 1000 | Pass |
| | | -10°C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 4.23 | 1000 | Pass |
| | | 0° C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 4.30 | 1000 | Pass |
| | | 10° C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 6.39 | 1000 | Pass |
| | | 20° C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 3.95 | 1000 | Pass |
| | | 30° C Temperature Conditions | | | | | | |
| | | Mid CHannel 1962.5 MHz | | | | 6.89 | 1000 | Pass |
| | | | | | | 0.09 | | |
| | | 40° C Temperature Conditions | | | | | | |
| | | 40° C Temperature Conditions Mid CHannel 1962.5 MHz | | | | 4.12 | 1000 | Pass |
| | | 40° C Temperature Conditions Mid CHannel 1962.5 MHz 50° C Temperature Conditions | | | | 4.12 | | Pass |
| | | 40° C Temperature Conditions Mid CHannel 1962.5 MHz 50° C Temperature Conditions Mid CHannel 1962.5 MHz | | | | | 1000 | |
| | 40.8 VDC Ex | 40° C Temperature Conditions Mid CHannel 1962.5 MHz 50° C Temperature Conditions | | | | 4.12 | | Pass |
| | 40.8 VDC Ex | 40° C Temperature Conditions Mid CHannel 1962.5 MHz 50° C Temperature Conditions Mid CHannel 1962.5 MHz treme Low Voltage Conditions 20° C Temperature Conditions Mid CHannel 1962.5 MHz | | | | 4.12 | | Pass |
| | 40.8 VDC Ex | 40° C Temperature Conditions Mid CHannel 1962.5 MHz 50° C Temperature Conditions Mid CHannel 1962.5 MHz treme Low Voltage Conditions 20° C Temperature Conditions | | | | 4.12 4.93 | 1000 | Pass Pass |



1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, -30°C Temperature Conditions, Mid CHannel 196 Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result 4.85 1000 Pass Keysight LTE & LTE-A FDD - Modulation Analysis 01:18:39 AM Mar 19, 20 Carrier Ref Freq: 1.962500000 GHz Trig: External Avg|Hold: 100 % #Atten: 32 dB (Elec 16) Ext Gain: -41.60 dB Direction: Downlink Num CC(s): 1 Carrier Ref Freq 1.962500000 GHz Ch1 Error Summary (CC0) %rms at EVMWindow End % at sym 10, subcar -150 EVM EVM Pk = 1.4934= 7.9595 Data EVM = 1.4881 %rms - 3GPP-defined QPSK EVM = 1.4971 %rms - 3GPP-defined 16QAM EVM = ----- 3GPP-defined 64QAM EVM = -RS EVM = 1.7349 %rms Channel Power = 39.23 dBm RS Tx. Power (Avg) OFDM Sym. Tx. Power RS Rx. Power (Avg) = 14.485 dBm = 39.273 dBm = 14,485 dBm = 39.244 RSSI dBm RS Rx. Quality = -10.777 dB Freq Err = 4.8542 = 99.839 % using P-SS SyncCorr %rms **Common Tracking Error** = 6.9492 = 0.01705 SymClk Err ppm = 86.000 Time Offset usec = -62.955 IQ Offset IQ Gain Imbalance = 0.001 IQ Quad. Error 15.768 mdeg IQ Timing Skew 99.667 fsec **CP** Length Mode = Normal(auto) Cell ID (auto) 5 ell ID G To STATUS Isg JAIready in Single, press Restart to initiate a new sweep or sequence

1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, -20°C Temperature Conditions, Mid CHannel 196 Absolute Value Frequency Δ (Hz) Δ (Hz) Result

5.78

1000

Pass

| Keysight LTE & LTE-A FDD - Modulation Ana | lysis | | | | - f |
|---|-------------|--------|--|-----------------|---|
| RF 50 Ω AC | | | T REF Carrier Ref Freg: 1.9625 | 00000 CH- | 12:23:19 AM Mar 19, 20 |
| arrier Ref Freq 1.962500 | 000 GHz | | Carrier Ref Fred: 1.9625 Trig: External1 #Atten: 32 dB (Elec 16) | Avg Hold: 100 % | TRACE 1234 Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | |
| EVM | = 1.4725 | %rms | at EVMWindow | End | |
| EVM Pk | = 7.7584 | % | at sym 10, sub | car -150 | |
| Data EVM | = 1.4739 | %rms | | | |
| - 3GPP-defined QPSK EVM | = 1.4821 | %rms | | | |
| - 3GPP-defined 16QAM EVN | = | | | | |
| - 3GPP-defined 64QAM EVN | = | | | | |
| RS EVM | = 1.7177 | %rms | | | |
| Channel Power | = 39.394 | dBm | | | |
| RS Tx. Power (Avg) | = 14.649 | dBm | | | |
| OFDM Sym. Tx. Power | = 39.438 | dBm | | | |
| RS Rx. Power (Avg) | = 14.649 | dBm | | | |
| RSSI | = 39,408 | dBm | | | |
| RS Rx. Quality | = -10.777 | dB | | | |
| Freg Err | = 5.7743 | Hz | | | |
| SyncCorr | = 99.833 | % | using P-SS | | |
| Common Tracking Error | = 4.9533 | %rms | | | |
| SymClk Err | = 0.01058 | ppm | | | |
| Time Offset | = 86.000 | usec | | | |
| IQ Offset | = -62.978 | dB | | | |
| IQ Gain Imbalance | = 0.001 | dB | | | |
| IQ Quad. Error | = 16.963 | mdeg | | | |
| IQ Timing Skew | = -11.370 | psec | | | |
| CP Length Mode | = Normal(au | uto) | | | |
| Cell ID | = 5 | | auto) | | |
| Cell ID Group/Sector | = 1/2 | (auto) | | | |



| | | | | | Absolute Value | Limit | |
|---|-----------------------|-------------|---------|--|--|--------|--|
| | | | | | Frequency ∆ (Hz) | Δ (Hz) | Result |
| | | | | | 4.23 | 1000 | Pass |
| | | | | | | | |
| Keysight LTE & LTE-A FDD - Modulation A | alysis | | | | | | 6 |
| RF 50 Q AC | a succession | | XT REF | | | | 11:15:35 PM Mar 18, 20 |
| Carrier Ref Freq 1.962500 | 0000 GHz | - | Trig: E | r Ref Freq: 1 External1 : 32 dB (Ele | .962500000 GHz Avg Hold: 100 : 16) Ext Gain: -41.0 | | TRACE 1234 oction: Downlink n CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | | | |
| EVM | = 1.4750 | %rms | at | EVMWin | dow End | | |
| EVM Pk | = 7.9622 | | | | subcar -150 | | |
| Data EVM | = 1.4754 | %rms | | | | | |
| - 3GPP-defined QPSK EVM | = 1.4820 | %rms | | | | | |
| - 3GPP-defined 16QAM EV | | | | | | | |
| - 3GPP-defined 64QAM EV | | | | | | | |
| RSEVM | = 1.7268 | %rms | | | | | |
| Channel Power | = 39.387 | dBm | | | | | |
| RS Tx. Power (Avg) | = 14.644 | dBm | | | | | |
| OFDM Sym. Tx. Power | = 39.43 | dBm | | | | | |
| RS Rx. Power (Avg) RSSI | = 14.644 = 39.403 | dBm dBm | | | | | |
| RS Rx. Quality | = -10.775 | dB | | | | | |
| | | | | | | | |
| Freq Err | = 4.2293 | Hz | | | | | |
| SyncCorr | = 99.791 = 4.8737 | | | ng P-SS | | | |
| Common Tracking Error SymClk Err | = 4.8737 = 0.01478 | %rms | | | | | |
| Time Offset | = 0.01478 = 86.000 | ppm usec | | | | | |
| IQ Offset | = -62.979 | dB | | | | | |
| IQ Gain Imbalance | = 0.001 | dB | | | | | |
| IQ Quad. Error | = 14.417 | mdeg | | | | | |
| IQ Timing Skew | = -7.3148 | psec | | | | | |
| CP Length Mode | = Normal(a | uto) | | | | | |
| Cell ID | = 5 | | auto) | | | | |
| Cell ID Group/Sector | = 1/2 | (auto) | | | | | |

i, 1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 0° C Temperature Conditions, Mid CHannel 1963 Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result 4.3 1000 Pass

| Keysight LTE & LTE-A FDD - Modulation Ana RF 50 Q AC | iysis | 1 | KT REF | | 10:10:22 PM Mar 18, 202 |
|---|-----------|--------|---|-----------------|---|
| Carrier Ref Freq 1.9625000 | 000 GHz | | Carrier Ref Freq: 1.962 Trig: External1 #Atten: 32 dB (Elec 16) | Avg Hold: 100 % | TRACE 1234 Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | |
| EVM | = 1.4750 | %rms | at EVMWindow | End | |
| EVM Pk | = 7.8319 | % | at sym 10, sul | bcar -150 | |
| Data EVM | = 1,4786 | %rms | | | |
| - 3GPP-defined QPSK EVM | = 1.4863 | %rms | | | |
| - 3GPP-defined 16QAM EVN | | | | | |
| - 3GPP-defined 64QAM EVN | = | | | | |
| RS EVM | = 1.7116 | %rms | | | |
| Channel Power | = 39.323 | dBm | | | |
| RS Tx. Power (Avg) | = 14.58 | dBm | | | |
| OFDM Sym. Tx. Power | = 39.364 | dBm | | | |
| RS Rx. Power (Avg) | = 14.58 | dBm | | | |
| RSSI | = 39.337 | dBm | | | |
| RS Rx. Quality | = -10.777 | dB | | | |
| Freq Err | = 4.2992 | Hz | | | |
| SyncCorr | = 99.795 | % | using P-SS | | |
| Common Tracking Error | = 5.2841 | %rms | | | |
| SymClk Err | = 0.01527 | ppm | | | |
| Time Offset | = 86.000 | usec | | | |
| IQ Offset | = -63.143 | dB | | | |
| IQ Gain Imbalance | = 0.001 | dB | | | |
| IQ Quad. Error | = 11.119 | mdeg | | | |
| IQ Timing Skew | = -12.075 | psec | | | |
| CP Length Mode | = Normal(| auto) | | | |
| Cell ID | = 5 | | auto) | | |
| Cell ID Group/Sector | = 1/2 | (auto) | | | |



1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 10° C Temperature Conditions, Mid CHannel 196 Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result 6.39 1000 Pass

| Keysight LTE & LTE-A FDD - Modulation | Finalysis | 1 | E | XT REF | 1 | | | 09:08:54 PM Mar 18, 2 |
|---------------------------------------|-----------|----------|--------|-------------------------|--|-------|---|---|
| Carrier Ref Freq 1.96250 | 00000 | SHz | - | Carrier R Trig: Exte | ef Freq: 1.96 ernal1 2 dB (Elec 10 | A |) GHz vg Hold: 100 % xt Gain: -41.60 dB | TRACE 1234 Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | | | | |
| EVM | = 1. | 5040 | %rms | at E | VM Windo | w End | | |
| EVM Pk | = 7. | 6522 | % | at sy | m 10, s | ubcar | -150 | |
| Data EVM | = 1. | 4977 | %rms | | | | | |
| - 3GPP-defined QPSK EV | M = 1. | 5058 | %rms | | | | | |
| - 3GPP-defined 16QAM E | VM = | | | | | | | |
| - 3GPP-defined 64QAM E | VM = | | | | | | | |
| RS EVM | = 1. | 7169 | %rms | | | | | |
| Channel Power | = 39 | 9.38 | dBm | | | | | |
| RS Tx. Power (Avg) | = 14 | 1.635 | dBm | | | | | |
| OFDM Sym. Tx. Power | = 39 | 9.422 | dBm | | | | | |
| RS Rx. Power (Avg) | = 14 | 4.635 | dBm | | | | | |
| RSSI | = 39 | 9.394 | dBm | | | | | |
| RS Rx. Quality | = -1 | 0.775 | dB | | | | | |
| Freq Err | = 6. | 3945 | Hz | | | | | |
| SyncCorr | = 99 | 9.789 | % | using | P-SS | | | |
| Common Tracking Error | = 5. | 7007 | %rms | | | | | |
| SymClk Err | = 0. | 01485 | ppm | | | | | |
| Time Offset | = 86 | 6.000 | usec | | | | | |
| IQ Offset | = -6 | 3.051 | dB | | | | | |
| IQ Gain Imbalance | = 0. | 001 | dB | | | | | |
| IQ Quad. Error | = 13 | 3.027 | mdeg | | | | | |
| IQ Timing Skew | = -1 | 3.046 | psec | | | | | |
| CP Length Mode | = N | ormal(au | uto) | | | | | |
| Cell ID | = 5 | | | auto) | | | | |
| Cell ID Group/Sector | = 1/ | 2 | (auto) | | | | | |

1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 20° C Temperature Conditions, Mid CHannel 196
Absolute Value
Limit
Frequency Δ (Hz) Δ (Hz) Result

| Keysight LTE & LTE-A FDD - Modulation An | alysis | | | | | | - | |
|--|--------|------------|--------|-----------|--|--------------|---|---|
| RF 50 Ω AC Carrier Ref Freq 1.962500 | 00 |) GHz | | Trig: Ext | Ref Freq: 1.962 ernal1 2 dB (Elec 16 | Avg Hold: 10 | | 7:32 AM Mar 18, 2022 TRACE 1 2 3 4 5 6 : Downlink 5): 1 |
| Ch1 Error Summary (CC0) | | | | | | | | - |
| EVM | | 1.4539 | %rms | at E | VMWindow | v End | | |
| EVM Pk | | 7.9847 | % | at s | ym 15, st | ibcar 150 | | |
| Data EVM | | 1.4536 | %rms | | | | | |
| - 3GPP-defined QPSK EVM | | 1.4604 | %rms | | | | | |
| - 3GPP-defined 16QAM EV | v1 = | | | | | | | |
| - 3GPP-defined 64QAM EVM | /I = | | | | | | | |
| RS EVM | | 1.6881 | %rms | | | | | |
| Channel Power | | 39.417 | dBm | | | | | |
| RS Tx. Power (Avg) | | 14.671 | dBm | | | | | |
| OFDM Sym. Tx. Power | | 39.455 | dBm | | | | | |
| RS Rx. Power (Avg) | | 14.671 | dBm | | | | | |
| RSSI | | 39.43 | dBm | | | | | 10 A |
| RS Rx. Quality | | -10.776 | dB | | | | | |
| Freq Err | = | 3.9515 | Hz | | | | | |
| SyncCorr | | 99.872 | % | using | P-SS | | | |
| Common Tracking Error | | 4.9842 | %rms | | | | | |
| SymClk Err | | 0.01914 | ppm | | | | | |
| Time Offset | | 85.999 | usec | | | | | |
| IQ Offset | | -63.031 | dB | | | | | |
| IQ Gain Imbalance | | 0.001 | dB | | | | | |
| IQ Quad. Error | | 17.934 | mdeg | | | | | |
| IQ Timing Skew | | -4.6255 | psec | | | | | |
| CP Length Mode | | Normal(aut | to) | | | | | _ |
| Cell ID | | 5 | | auto) | | | | |
| Cell ID Group/Sector | = | 1/2 | (auto) | | | | | - |



1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 30° C Temperature Conditions, Mid CHannel 196 Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result 6.89 1000 Pass

| Keysight LTE & LTE-A FDD - Modulation / | Analysis | | |) @ |
|---|-----------------------|--------|--|-----|
| RF 50Ω AC | and the second second | | T REF 02:33:40 AM Ma | |
| Carrier Ref Freq 1.96250 | 0000 GHz | T | Zarrier Ref Freq: 1.962500000 GHz TRACE Trig: External1 Avg Hold: 100 % Direction: Down Match: 32 dB (Elec 16) Ext Gain: 41.60 dB Num CC(s): 1 | |
| Ch1 Error Summary (CC0) | | | | |
| EVM | = 1.5300 | %rms | at EVM Window End | |
| EVM Pk | = 7.6797 | % | at sym 10, subcar -150 | |
| Data EVM | = 1.5163 | %rms | | |
| - 3GPP-defined QPSK EV | A = 1.5225 | %rms | | |
| - 3GPP-defined 16QAM E\ | /M = | | | |
| - 3GPP-defined 64QAM E\ | /M = | | | |
| RS EVM | = 1.7598 | %rms | | |
| Channel Power | = 39.312 | dBm | | |
| RS Tx. Power (Avg) | = 14.571 | dBm | | |
| OFDM Sym. Tx. Power | = 39.352 | dBm | | |
| RS Rx. Power (Avg) | = 14.571 | dBm | | |
| RSSI | = 39.329 | dBm | | |
| RS Rx. Quality | = -10.776 | dB | | |
| Freq Err | = 6.8875 | Hz | | |
| SyncCorr | = 99.834 | % | using P-SS | |
| Common Tracking Error | = 8.9350 | %rms | | |
| SymClk Err | = 0.01402 | ppm | | |
| Time Offset | = 86.000 | usec | | |
| IQ Offset | = -63.077 | dB | | |
| IQ Gain Imbalance | = 0.001 | dB | | |
| IQ Quad. Error | = 11.277 | mdeg | | |
| IQ Timing Skew | = -12.506 | psec | | |
| CP Length Mode | = Normal(au | to) | | |
| Cell ID | = 5 | | auto) | |
| Cell ID Group/Sector | = 1/2 | (auto) | or sequence | |

1930 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 40° C Temperature Conditions, Mid CHannel 196
Absolute Value
Limit
Frequency Δ (Hz) Δ (Hz) Result

4.12

1000

Pass

| Keysight LTE & LTE-A FDD - Modulation Ana | ilysis | | | | | | | e d |
|--|--------|------------|--------|---------|---------------------------|---------|--------------------------------------|---|
| arrier Ref Freq 1.962500 | 000 | CH7 | | Carrier | Ref Freq: 1.9 | 6250000 | 0 GHz | 03:45:08 AM Mar 19, 20 TRACE 1 2 3 4 |
| amer Ker Freq 1.902500 | 000 | J GHZ | | Trig: E | xternal1 32 dB (Elec 1 | A | vg Hold: 100 % xt Gain: -41.60 dB | Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | | | | |
| E√M | | 1.4845 | %rms | s at | EVMWindo | ow End | ł | |
| EVM Pk | | 7,9857 | % | 6 at | sym 10, s | subcar | -150 | |
| Data EVM | | 1.4807 | %rms | 5 | | | | |
| - 3GPP-defined QPSK EVM | | 1.4888 | %rms | 5 | | | | |
| 3GPP-defined 16QAM EVN | = | | | | | | | |
| 3GPP-defined 64QAM EVN | | | | | | | | |
| RSEVM | | 1.7300 | %rms | | | | | |
| Channel Power | | 39.236 | dBn | | | | | |
| RS Tx. Power (Avg) | | 14.496 | dBn | | | | | |
| OFDM Sym. Tx. Power | | 39.282 | dBn | n | | | | |
| RS Rx. Power (Avg) | | 14.496 | dBn | | | | | |
| RSSI | | 39.254 | dBn | | | | | |
| RS Rx. Quality | | -10.777 | dB | | | | | |
| Freq Err | | 4.1247 | Hz | | | | | |
| SyncCorr | | 99.831 | % | 6 usin | g P-SS | | | |
| Common Tracking Error | | 4.7840 | %rms | 5 | | | | |
| SymClk Err | | 0.01589 | ppm | 1 | | | | |
| Time Offset | | 86.000 | usec | | | | | |
| Q Offset | | -62.96 | dB | | | | | |
| Q Gain Imbalance | | 0.001 | dB | | | | | |
| Q Quad. Error | | 15.181 | mdeg | 3 | | | | |
| Q Timing Skew | = | -9.9831 | psec | | | | | |
| CP Length Mode | | Normal(aut | o) | | | | | |
| Cell ID | | 5 | | (auto) | | | | |
| Cell ID Group/Sector | = | 1/2 | (auto) | | | | | |



| Keysight LTE & LTE-A FDD - Modulation RF 50 Ω AC | | EXT REF | | | 04:29:05 AM Mar 19, 2 |
|---|------------|----------------|--|-----------------|-------------------------------------|
| Carrier Ref Freq 1.9625 | 00000 GHz | Carri Trig: | er Ref Freq: 1.9625 External1 n: 32 dB (Elec 16) | Avg Hold: 100 % | Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | |
| E√M | = 1.4995 | %rms at | EVMWindow | End | |
| EVM Pk | = 7.8791 | % at | sym 10, sub | car -150 | |
| Data EVM | = 1.4950 | %rms | | | |
| - 3GPP-defined QPSK EV | M = 1.4984 | %rms | | | |
| - 3GPP-defined 16QAM E | | | | | |
| - 3GPP-defined 64QAM E | | | | | |
| RS EVM | = 1.7383 | %rms | | | |
| Channel Power | = 39.301 | dBm | | | |
| RS Tx. Power (Avg) | = 14.557 | dBm | | | |
| OFDM Sym. Tx. Power | = 39,342 | dBm | | | |
| RS Rx. Power (Avg) | = 14.557 | dBm | | | |
| RSSI | = 39.315 | dBm | | | |
| RS Rx. Quality | = -10.776 | dB | | | |
| Freq Err | = 4.9323 | Hz | | | |
| SyncCorr | = 99.833 | % us | ing P-SS | | |
| Common Tracking Error | = 5.9226 | %rms | | | |
| SymClk Err | = 0.02546 | ppm | | | |
| Time Offset | = 86.000 | usec | | | |
| IQ Offset | = -62.994 | dB | | | |
| IQ Gain Imbalance | = 0.001 | dB | | | |
| IQ Quad. Error | = 16.740 | mdeg | | | |
| IQ Timing Skew | = -9.5274 | psec | | | |
| CP Length Mode | = Normal(a | | | | |
| Cell ID | = 5 | (auto |) | | |
| Cell ID Group/Sector | = 1/2 | (auto) | | STATUS | |

30 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 40.8 VDC Extreme Low Voltage Conditions, 20° C Temperature Conditions, Mid CHannel Absolute Value Example of the second se

| Frequency Δ (Hz) Δ (Hz) Result |
|--------------------------------|
| 3.68 1000 Pass |

| RF 50 ی AC Carrier Ref Freq 1.9625000 | 000 | GHz | 1 | rig: Ex | Ref Freq: ternal1 32 dB (El | | Avgl | lz lold: 100 % ain: -41.60 dΒ | 03:24:29 AM Mar 18, : TRACE 1235 Direction: Downlink Num CC(s): 1 |
|--|-----|-----------|--------|---------|-----------------------------------|------|------|-------------------------------------|--|
| Ch1 Error Summary (CC0) | | | | | | | | | |
| EVM | | 1.4702 | %rms | at | EVMWi | ndow | End | | |
| EVM Pk | | 7.7525 | % | at | sym 15, | subo | ar 1 | 50 | |
| Data EVM | | 1.4684 | %rms | | | | | | |
| - 3GPP-defined QPSK EVM | | 1.4726 | %rms | | | | | | |
| - 3GPP-defined 16QAM EVN | = - | | | | | | | | |
| - 3GPP-defined 64QAM EVN | = - | | | | | | | | |
| RS EVM | | 1.6915 | %rms | | | | | | |
| Channel Power | = (| 39.418 | dBm | | | | | | |
| RS Tx. Power (Avg) | | 14.682 | dBm | | | | | | |
| OFDM Sym. Tx. Power | | 39.468 | dBm | | | | | | |
| RS Rx. Power (Avg) | | 14.682 | dBm | | | | | | |
| RSSI | | 39.441 | dBm | | | | | | |
| RS Rx. Quality | | 10.775 | dB | | | | | | |
| Freq Err | = ; | 3.6789 | Hz | | | | | | |
| SyncCorr | = { | 99.873 | % | usin | g P-S | S. | | | |
| Common Tracking Error | = 4 | 4.4768 | %rms | | | | | | |
| SymClk Err | = (| 0.01410 | ppm | | | | | | |
| Time Offset | = { | 85.999 | usec | | | | | | |
| IQ Offset | | 63.018 | dB | | | | | | |
| IQ Gain Imbalance | | 0.001 | dB | | | | | | |
| IQ Quad. Error | | 14.663 | mdeg | | | | | | |
| IQ Timing Skew | | 9.0442 | psec | | | | | | |
| CP Length Mode | = | Normal(au | to) | | | | | | |
| Cell ID | = { | 5 | (a | auto) | | | | | |
| Cell ID Group/Sector | = | 1/2 | (auto) | | | | | | |



30 MHz - 1995 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 55.2 VDC Extreme High Voltage Conditions, 20° C Temperature Conditions, Mid CHannel Absolute Value Frequency Δ (Hz) Δ (Hz) Result 3.97 1000 Pass

| Keysight LTE & LTE-A FDD - Modulation Ana RF 50 Q AC | nysis | 1 | 1 . | XT REF | | | | | | |
|---|-------|-----------|--------|-------------------|--|-----|------|--|---|--|
| Carrier Ref Freq 1.962500 | 000 | 0 GHz | + | Carrie Trig: E | r Ref Freq: External1 : 32 dB (Ele | | Avg | 6Hz Hold: 100 % Gain: -41.60 dB | 03:20:13 AM Mar18, TRACE 1 2 3 Direction: Downlink Num CC(s): 1 | |
| Ch1 Error Summary (CC0) | | | | | | | | | | |
| EVM | | 1.4506 | %rms | at | EVMWir | dow | End | | | |
| EVM Pk | | 7.8812 | % | at | sym 15, | su | bcar | 150 | | |
| Data EVM | | 1.4496 | %rms | | | | | | | |
| - 3GPP-defined QPSK EVM | | 1.4584 | %rms | | | | | | | |
| - 3GPP-defined 16QAM EVM | / = | | | | | | | | | |
| - 3GPP-defined 64QAM EVN | 1 = | | | | | | | | | |
| RSEVM | | 1.6917 | %rms | | | | | | | |
| Channel Power | | 39.472 | dBm | | | | | | | |
| RS Tx. Power (Avg) | | 14.728 | dBm | 1 | | | | | | |
| OFDM Sym. Tx. Power | | 39.513 | dBrr | | | | | | | |
| RS Rx. Power (Avg) | | 14.728 | dBn | 1 | | | | | | |
| RSSI | | 39.488 | dBrr | 1 | | | | | | |
| RS Rx. Quality | | -10.776 | dB | | | | | | | |
| Freq Err | | 3.9660 | Hz | | | | | | | |
| SyncCorr | | 99.872 | % | usi | ng P-SS | 5 | | | | |
| Common Tracking Error | | 4.7413 | %rms | | | | | | | |
| SymClk Err | | 0.01713 | ppm | | | | | | | |
| Time Offset | | 85.999 | usec | | | | | | | |
| IQ Offset | | -63.03 | dB | | | | | | | |
| IQ Gain Imbalance | | 0.001 | dB | | | | | | | |
| IQ Quad. Error | | 15.595 | mdeg | | | | | | | |
| IQ Timing Skew | = | -13.492 | psec | | | | | | | |
| CP Length Mode | | Normal(au | uto) | | | | | | | |
| Cell ID | | 5 | | (auto) | | | | | | |
| Cell ID Group/Sector | = | 1/2 | (auto) | | | | | | | |



| | | | Work Order: | NOK10027 | XMit 2020. |
|---|-------------------------------|---------------------------------|--------------------------------------|------------------------------|------------------------------|
| EUT: AHFII Remote Radio Head Serial Number: YK214000036 | | | | 18-Mar-22 | |
| Customer: Nokia Solutions and Networks | | | Temperature: | | |
| Attendees: David Le, John Rattanavong | | | Humidity: | | |
| Project: None | | | Barometric Pres.: | | |
| Tested by: Marty Martin | Power: 48 VI | | Job Site: | | |
| ST SPECIFICATIONS | | Method | Job Site: | 1705 | |
| C 27:2022 | | C63.26:2015 | | | |
| S-139 Issue 3:2015 | | 139 Issue 3:2015 | | | |
| | | | | | |
| S-170 Issue 3:2015 MMENTS | R55- | 170 Issue 3:2015 | | | |
| measurement path losses were accounted for in the reference level offest nutes) prior to measurements. | ncluding any attenuators, fil | ters and DC blocks. The EUT ter | nperature was stabilized at each tem | perature step (for a | a minimum of ∶ |
| VIATIONS FROM TEST STANDARD | | | | | |
| ne | | | | | |
| onfiguration # 6 | ty Marti | | | | |
| | | | Absolute Value | Limit | |
| nd 66, 2110 MHz - 2200 MHz, LTE Single Carrier | | | Frequency Δ (Hz) | Δ (Hz) | Result |
| -30°C Temperature Conditions Mid CHannel 2155 Mi -20°C Temperature Conditions | iz | | 5.62 | 1000 | Pass |
| Mid CHannel 2155 Mi | | | 6.55 | 1000 | Pass |
| -10°C Temperature Conditions | - | | | | |
| Mid CHannel 2155 M | +z | | 5.83 | 1000 | Pass |
| 0° C Temperature Conditions | - | | | | |
| Mid CHannel 2155 M | +z | | 5.68 | 1000 | Pass |
| 10° C Temperature Conditions | | | | | |
| Mid CHannel 2155 Mi | +z | | 0.05 | | |
| 20° C Temperature Conditions | | | 6.05 | 1000 | Pass |
| | | | 6.05 | 1000 | Pass |
| Mid CHannel 2155 Mi | 1z | | 5.80 | 1000 | Pass Pass |
| Mid CHannel 2155 Mi 30° C Temperature Conditions | łz | | | | |
| | | | | | |
| 30° C Temperature Conditions | | | 5.80 | 1000 | Pass |
| 30° C Temperature Conditions Mid CHannel 2155 MI | Ηz | | 5.80 | 1000 | Pass |
| 30° C Temperature Conditions Mid CHannel 2155 Mi 40° C Temperature Conditions | Ηz | | 5.80 | 1000 1000 | Pass Pass |
| 30° C Temperature Conditions Mid CHannel 2155 Mi 40° C Temperature Conditions Mid CHannel 2155 Mi 50° C Temperature Conditions Mid CHannel 2155 Mi | Hz Hz | | 5.80 | 1000 1000 | Pass Pass |
| 30° C Temperature Conditions Mid CHannel 2155 M 40° C Temperature Conditions Mid CHannel 2155 M 50° C Temperature Conditions | Hz Hz | | 5.80 5.33 5.33 | 1000 1000 1000 | Pass Pass Pass |
| 30° C Temperature Conditions Mid CHannel 2155 Mi 40° C Temperature Conditions Mid CHannel 2155 Mi 50° C Temperature Conditions Mid CHannel 2155 Mi 40.8 VDC Extreme Low Voltage Conditions 20° C Temperature Conditions Mid CHannel 2155 Mi | tz tz | | 5.80 5.33 5.33 | 1000 1000 1000 | Pass Pass Pass |
| 30° C Temperature Conditions Mid CHannel 2155 Mi 40° C Temperature Conditions Mid CHannel 2155 Mi 50° C Temperature Conditions Mid CHannel 2155 Mi 40.8 VDC Extreme Low Voltage Conditions 20° C Temperature Conditions Mid CHannel 2155 Mi 55.2 VDC Extreme High Voltage Conditions | tz tz | | 5.80 5.33 5.33 5.64 | 1000 1000 1000 1000 | Pass Pass Pass Pass |
| 30° C Temperature Conditions Mid CHannel 2155 Mi 40° C Temperature Conditions Mid CHannel 2155 Mi 50° C Temperature Conditions Mid CHannel 2155 Mi 40.8 VDC Extreme Low Voltage Conditions 20° C Temperature Conditions Mid CHannel 2155 Mi | tz tz | | 5.80 5.33 5.33 5.64 | 1000 1000 1000 1000 | Pass Pass Pass Pass |



| Band 66, 2110 MHz - 2200 | IVILIZ, LIL OILIGIE | | л. т, о IVIП. | 2 Danuwiul | | | | mai vondy | - conducins, - | | | | 5 MHz |
|--|--|--|---|---|---|--------------------------------|---------------------------|---|-----------------|------------|------------------|-----------------------|-------|
| | | ournor, r c | | Absolu | ute Value | Limit | | | | oo o rompo | | | |
| | | | | Freque | ncy ∆ (Hz) | Δ (Hz) | | Result | _ | | | | |
| | | | | 5 | 5.62 | 1000 | | Pass | | | | | |
| Keysight LTE & LTE-A FDD - Modulation | analysis | | | | | | _ | 0 | x =1 | | | | |
| RF 50 D AC | | DJ | REF | | | | 01:19: | 19 AM Mar 19, 201 | 22 | | | | |
| Carrier Ref Freq 2.15500 | 0000 GHz | | | req: 2.1550000 | Avg Hold: 100 ' Ext Gain: -41.6 | % | Direction: | RACE 12015 | | | | | |
| | | #A | Atten: 32 dB | (Elec 16) | Ext Gain: -41.6 | 0 dB | Num CC(s) | :1 | - | | | | |
| Ch1 Error Summary (CC0) | | | | | | | | | | | | | |
| EVM | = 1.6036 | % mas | | Window E | nd | | | | | | | | |
| EVM Pk | = 8.1003 | % | at sym 2 | 25, subca | ar -85 | | | | | | | | |
| Data EVM | = 1.6180 | %rms | | | | | | | | | | | |
| - 3GPP-defined QPSK EV | M = 1.6349 | %rms | | | | | | | | | | | |
| - 3GPP-defined 16QAM EV | | | | | | | | | | | | | |
| - 3GPP-defined 64QAM EV RS EVM | = 1.5561 | %rms | | | | | | | | | | | |
| Channel Power | = 39.262 | dBm | | | | | | | | | | | |
| RS Tx. Power (Avg) | = 14.506 | dBm | | | | | | | | | | | |
| OFDM Sym. Tx. Power | = 39.287 | dBm | | | | | | | | | | | |
| RS Rx. Power (Avg) RSSI | = 14.506 = 39.265 | dBm dBm | | | | | | | 8 | | | | |
| RSSI RS Rx. Quality | = 39.265 = -10.772 | dBm dB | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Freq Err SyncCorr | = 5.6199 = 99.914 | Hz | using P. | 22. | | | | | | | | | |
| Common Tracking Error | = 9,6261 | %rms | using P | 00 | | | | | | | | | |
| SymClk Err | = 0.01124 | ppm | | | | | | | | | | | |
| Time Offset | = 86.012 | usec | | | | | | | | | | | |
| IQ Offset | = -62.345 | dB | | | | | | | | | | | |
| IQ Gain Imbalance IQ Quad. Error | = -0.007 = 31.473 | dB mdeg | | | | | | | | | | | |
| IQ Timing Skew | = 31.756 | psec | | | | | | | | | | | |
| | = Normal(au | | | | | | | | | | | | |
| CP Length Mode Cell ID | = Normal(au | | | | | | | | 1 | | | | |
| Cell ID Group/Sector | - 2/0 | (Deckson) | uto) | | | | | | 613 I | | | | |
| | estore to minute of | ian anoop o | or sequence | | STATUS | | | | 21 | | | | |
| Band 66, 2110 MHz - 2200 | | | | Iz Bandwidt Absolu | th, QPSK Mod ute Value | Limit | | | e Conditions, - | 20°C Tempe | erature Conditio | ons, Mid CHannel 215 | 5 MHz |
| Band 66, 2110 MHz - 2200 | | | | Iz Bandwidt Absolu Freque | th, QPSK Mod | | | ninal Voltag Result Pass | e Conditions, - | 20°C Tempe | erature Conditio | ons, Mid CHannel 215 | 5 MHz |
| Band 66, 2110 MHz - 2200 | | | | Iz Bandwidt Absolu Freque | th, QPSK Mod ute Value ncy Δ (Hz) | Limit ∆ (Hz) | | Result | e Conditions, - | 20°C Tempe | erature Conditik | ons, Mid CHannel 215 | 5 MHz |
| Band 66, 2110 MHz - 2200 | MHz, LTE Single | | | Iz Bandwidt Absolu Freque | th, QPSK Mod ute Value ncy Δ (Hz) | Limit ∆ (Hz) | | Result Pass |) × | 20°C Tempe | erature Conditio | ons, Mid CHannel 215 | 5 MHz |
| keysight LTE δι LTE-Å FDD - Modulation. | MHz, LTE Single | Carrier, Po | port 1, 5 MH: REFI | z Bandwidt Absolu Frequei | th, QPSK Mod ute Value ncy Δ (Hz) 5.55 | Limit <u>A (Hz)</u> 1000 | 12:24: | Result Pass 00 AM Mar 19, 20, | 22 | 20°C Tempe | erature Conditi | ons, Mid CHannel 2158 | 5 MHz |
| | MHz, LTE Single | e Carrier, Pc | REF REF | z Bandwidt Absolu Frequei 6 req: 2.155000 | th, QPSK Mod ute Value ncy Δ (Hz) 5.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 2158 | 5 MHz |
| Keysight UT & 6LTC-AF00 - Modulation 0 59 50 0 cc Carrier Ref Freq 2.15500 | MHz, LTE Single | e Carrier, Pc | REF Arrier Ref Fr | z Bandwidt Absolu Frequei 6 req: 2.155000 | th, QPSK Mod ute Value ncy Δ (Hz) 5.55 | Limit <u>A (Hz)</u> 1000 | 12:24: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditio | ons, Mid CHannel 215 | 5 MHz |
| keysight LTE δι LTE-Å FDD - Modulation. | MHz, LTE Single | e Carrier, Pc | REF REF | z Bandwidt Absolu Frequei 6 req: 2.155000 | th, QPSK Mod ute Value ncy Δ (Hz) 5.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | arature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Keysight UT & 6LTC-AF00 - Modulation 0 59 50 0 cc Carrier Ref Freq 2.15500 | MHz, LTE Single | ECarrier, Po | REF arrier Ref Fr ig: External Atten: 32 dB | z Bandwidt Absolu Frequei 6 req: 2.155000 | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Example TE & LTC-A FCD - Modulation D | MHz, LTE Single Autyre 0000 GHz = 1.5873 = 7.6145 | e Carrier, Pc | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequel 6 req: 2.155000 11 (Elec 16) | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| EveryInt TE & LTE-ATD0-Modulation Carrier Ref Freq 2.15500 Ch1 Error Summary (CC0) EVM EVM Pk Data EVM | MHz, LTE Single analysis 00000 GHz = 1.5873 = 7.6145 = 1.8067 | e Carrier, Pc | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditis | ons, Mid CHannel 2150 | 5 MHz |
| Chi Error Summary (CC0) EVM Pk Date EVM SCR 200 Chi Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined OPSK EVI | MHz, LTE Single 444/30 60000 GHz = 1.5873 = 7.6145 = 1.8067 M = 1.8224 | e Carrier, Pc | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditio | ons, Mid CHannel 215 | 5 MHz |
| Chi Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined QPSK EVI | MHz, LTE Single | e Carrier, Pc | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Chi Error Summary (CC0) EVM Pk Date EVM SCR 200 Chi Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined OPSK EVI | MHz, LTE Single | e Carrier, Pc | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditio | ons, Mid CHannel 2150 | 5 MHz |
| Carrier Ref Freq 2.15502 (CC0) Carrier Ref Freq 2.15500 Ch1 Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined OPSK EV/ - 3GPP-defined BOAM EV RS EV/M Channel Power | MHz, LTE Single analyse 00000 GHz = 1.5873 = 7.6145 = 1.6067 M = 1.6224 /M = M = = 1.5369 = 39.392 | e Carrier, Pc Ext G: G: G: G: G: G: G: Mirrs %rms %rms %rms dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Ch1 Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined QPSK EVI - 3GPP-defined 40AM EV - 3GPP-defined 40AM EV RS EVM Channel Power RS Tx. Power (Avg) | MHz, LTE Single analyse 00000 GHz = 1.5873 = 7.6145 = 1.6067 M = 1.6224 /M = = 1.5369 = 39.392 = 1.639 | %rms %rms %rms %rms %rms dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Consider the second sec | MHz, LTE Single | %rms %rms %rms %rms dBm dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | arature Conditio | ons, Mid CHannel 2150 | 5 MHz |
| Channel Power (Avg) Channel Power (Avg) Channel Power (Avg) Channel Power (Avg) Channel Power (Avg) Channel Power (Avg) Channel Power (Avg) | MHz, LTE Single analyse 00000 GHz = 1.5873 = 7.6145 = 1.8067 M = 1.6224 /M = /M = 1.5369 = 39.392 = 14.639 = 34.433 = 34.433 = 4.639 | %rms %rms %rms %rms %rms %rms dBm dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 2158 | 5 MHz |
| Consider the second sec | MHz, LTE Single | %rms %rms %rms %rms dBm dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Constitution of the second sec | MHz, LTE Single | %ms %ms %ms %ms %ms dBm dBm dBm dBm dBm dBm dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eq: 2.155000 (f) (Elec 16) Window E | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 2150 | 5 MHz |
| Change Prover (Avg) Change Prover (Avg) RS Rx, Power (Avg) RS Rx, Power (Avg) RS Rx, Cuellity Freq Err | MHz, LTE Single analyse 00000 GHz = 1.5873 = 7.6145 = 1.6067 M = 1.6224 /M = = 1.5389 = 39.392 = 39.392 = 39.392 = 39.393 = 39.395 = 39.395 = 10.775 = 6.5539 | %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 2158 | 5 MHz |
| Carrier Ref Freq 2.15502 ac Carrier Ref Freq 2.15500 Ch1 Error Summary (CC0) EVM EVM EX Data EVM - 3GPP-defined QPSK EVI - 3GPP-defined 18QAM EV - 3GPP-defined 18QAM EV - 3GPP-defined 48QAM EV - 3GPP-defined 48QAM EV RS EVM Channel Power RS Tx. Power (Avg) OFDM Sym. Tx. Power RS Rx. Power (Avg) RSSI RS Rx. Ouality Freq Err SyncCorr Common Tracking Error | MHz, LTE Single autyme 00000 GHz = 1.5873 = 7.6145 = 1.8067 M = 1.6224 /M = /M = 1.5369 = 39.392 = 14.639 = 39.395 = 39.395 = 10.775 = 6.5539 = 9.908 | %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | REF arrier Ref Fr ig: External atten: 32 dB | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Complete State Action Modulation Carrier Ref Freq 2.15500 Ch1 Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined 0PSK EVI - 3GPP-defined 180AM EV - 3GPP-defined 840AM EV - 3GPP-defined 840AM EV - 3GPP-defined 840AM EV - 3GPP-defined 480AM EV - 3GPP-defined 480AM EV - 3GPP-defined 480AM EV - 3GPP-defined 480AM EV - 3GPP-defined 180AM EV - 3GPV-defined 180AM EV - 3GPV-define | MHz, LTE Single | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm gmm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Compart 11 6L 1104 100 - Moduleton 2000 100 100 100 100 Carrier Ref Freq 2.15500 Ch1 Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined 0PSK EV/ - 3GPP-defined 0PSK EV/ - 3GPP-defined 0PSK EV/ - 3GPP-defined 40AM EV RS EV/M Channel Power RS Tx. Power (Avg) RS Rx. Cuality Freq Err SyncCorr Common Tracking Error SynClk Err Time Offset | MHz, LTE Single advice 00000 GHz = 1.5873 = 7.6145 = 1.8067 M = 1.6224 /M = = 1.5369 = 39.392 = 14.639 = 39.392 = 14.639 = 39.39413 = 14.639 = 39.395 = -10.775 = 6.5539 = 9.908 = 5.9885 = 0.01090 = 86.012 | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm gBm dBm gBm gBm gBm gBm gBm gBm gBm gBm gBm g | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditi | ons, Mid CHannel 215 | 5 MHz |
| Chi Error Summary (CC0) EVM Chi Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined 0PSK EVI - 3GPP-defined 18OAM EV - 3GPP-defined 18OAM EV - 3GPP-defined 84OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 18OAM EV - 3GPP | MHz, LTE Single | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Comparing the action of the ac | MHz, LTE Single advice 00000 GHz = 1.5873 = 7.6145 = 1.8067 M = 1.6224 /M = = 1.5369 = 39.392 = 14.639 = 39.392 = 14.639 = 39.39413 = 14.639 = 39.395 = -10.775 = 6.5539 = 9.908 = 5.9885 = 0.01090 = 86.012 | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Chi Error Summary (CC0) EVM Chi Error Summary (CC0) EVM EVM Pk Data EVM - 3GPP-defined 0PSK EVI - 3GPP-defined 18OAM EV - 3GPP-defined 18OAM EV - 3GPP-defined 84OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 48OAM EV - 3GPP-defined 18OAM EV - 3GPP | MHz, LTE Single 00000 GHz = 1.5873 = 7.6145 = 1.6067 M = 1.6224 /M = = 1.5369 = 38.392 = 14.639 = 39.395 = -10.775 = 6.5539 = 0.01090 = 86.012 = 6.2446 = -0.007 | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditi | ons, Mid CHannel 2158 | 5 MHz |
| Chiller Ref Freq 2.15500 Carrier Ref Freq 2.15500 Chiller Ref Freq 2.15500 EVM EVM Pk Data EVM - 3GPP-defined QPSK EVI - 3GPP-defined 480AM EV - 3GPP-defined 540AM EV - 3GPP- | MHz, LTE Single | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | erature Conditie | ons, Mid CHannel 215 | 5 MHz |
| Chi Error Summary (CCO) EVM EVM Pk Data EVM - 3GPP-defined QPSK EVI - 3GPP-defined 40PSK EVI - 3GPP-defined 40AM EV - 3GPP-defined 50AM EV RS EVM Channel Power RS Tx, Power (Avg) OFDM Sym, Tx, Power RS Tx, Power (Avg) OFDM Sym, Tx, Power RS Tx, Power (Avg) Channel Power RS Tx, Power (Avg) Channel Power Common Tracking Error SymCL Err Time Offset IQ Offset IQ Gain Imbalance IQ Quad, Error | MHz, LTE Single analyse 00000 GHz = 1.5873 = 7.6145 = 1.6067 M = 1.6224 /M = = 1.5369 = 39.392 = 39.392 = 39.392 = 39.393 = 39.393 = 39.395 = 10.775 = 6.5539 = 9.908 = 5.9885 = 0.01090 = 86.012 = -62.446 = -0.007 = 31.439 | %rms %rms %rms %rms %rms dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm | erri arrier Ref Fr nig: External ten: 32 dB at EVM1 at sym : | z Bandwidt Absolu Frequei (eisc 1550000) (Eisc 16) Window E 33, subcr | h, QPSK Mod ute Value ncy Δ (Hz) δ.55 | Limit <u>A (Hz)</u> 1000 | 12:24: T Direction: | Result Pass 00 AM Mar 19, 20 RACE Downlink | 22 | 20°C Tempe | arature Conditie | ons, Mid CHannel 215 | 5 MHz |

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Report No. NOKI0037.1 Rev. 1

actor = 2/0 (auto) ngle, press Restart to initiate a new sweep or se



| | | | Absolute Value Frequency Δ (Hz) | Limit ∆ (Hz) | Result | |
|--|-----------------------|-----------------------|--|------------------|------------------------|--|
| | | | 5.83 | 1000 | Pass | |
| | | | | | | |
| Keysight LTE & LTE-A FDD - Modulation An | alyses | | - | | 1:16:15 PM Mar 18, 202 | |
| Carrier Ref Freg 2.155000 | 000 GHz | EXT REF | reg: 2.155000000 GHz | | TRACE 12 | |
| | out one | Trig: Externa | All Avg Hold: 100 B (Elec 16) Ext Gain: -41.6 | | ion: Downlink | 7 |
| | _ | #Atten: 32 dt | 5 (Elec 16) Ext Gain: 41.6 | | C(s): 1 | |
| Ch1 Error Summary (CC0) | | | | | | |
| EVM | = 1,6155 | %rms at EVM | Window End | | | |
| EVM Pk | = 7.9762 | | 33, subcar 149 | | | |
| Data EVM | = 1.6337 | %rms | | | | |
| - 3GPP-defined QPSK EVM | | %rms | | | | |
| - 3GPP-defined 16QAM EV | | | | | | |
| - 3GPP-defined 64QAM EV/ RS EVM | = 1.5564 | 8/ | | | | |
| Channel Power | = 1,5564 | %ms dBm | | | | |
| RS Tx. Power (Avg) | = 14.705 | dBm | | | | |
| OFDM Sym. Tx. Power | = 39.481 | dBm | | | | |
| RS Rx, Power (Avg) | = 14,705 | dBm | | | | |
| RSSI | = 39.461 | dBm | | | | |
| RS Rx. Quality | = -10.775 | dB | | | | |
| Freg Err | = 5.8275 | Hz | | | | |
| SyncCorr | = 99.889 | % using I | P-SS | | | |
| Common Tracking Error | = 7.1246 | %rms | | | | |
| SymClk Err | = 0.01070 | ppm | | | | |
| Time Offset | = 86.012 | usec | | | | |
| IQ Offset IQ Gain Imbalance | = -62.405 = -0.007 | dB dB | | | | |
| IQ Gain Impalance IQ Quad. Error | = -0.007 | mdeg | | | | |
| IQ Timing Skew | = 31.847 | psec | | | | |
| CP Length Mode | = Normal(au | | | | | |
| CP Length Mode Cell ID | = Normal(au = 6 | to) (auto) | | | | |
| Cell ID Group/Sector | | (auto) | | | | - |
| wso JAIready in Single, press Res | | | e Lostatus | | | |
| | | | | | | |
| Band 66, 2110 MHz - 22 | 00 MHz. LTE Si | ngle Carrier, Port 1. | 5 MHz Bandwidth, QPSK | Modulation. 48 V | DC Nominal Vo | oltage Conditions, 0° C Temperature Conditions, Mid CHannel 2155 MHz |
| | | J, _ Jit i, | Absolute Value | Limit | | , |

| | | | | | ite Value ncy Δ (Hz) | Limit ∆ (Hz) | Result |
|---|-----------|--------|---|----------|---|-----------------|--------------------------------------|
| | | | | 5 | .68 | 1000 | Pass |
| | | | | | | | |
| Keysight LTE & LTE-A FDD - Modulation A | nalysis | EX | TREF | | | 1 | 0:11:12 PM Mar 18,1 |
| arrier Ref Freq 2.15500 | 0000 GHz | 1 | Carrier Ref Fre Trig: External1 Atten: 32 dB (E | A | 0 GHz vg Hold: 100 % xt Gain: -41.60 df | | TRACE 121 on: Downlink C(s): 1 |
| th1 Error Summary (CC0) | | | | | | | |
| EVM | = 1.6124 | %rms | at EVMW | indow En | | | |
| EVM Pk | = 7.8715 | % | at sym 2 | , subcar | 46 | | |
| Data EVM | = 1.6308 | %rms | | | | | |
| 3GPP-defined QPSK EVM | | %rms | | | | | |
| - 3GPP-defined 16QAM EV | 'M = | | | | | | |
| - 3GPP-defined 64QAM EV | 'M = | | | | | | |
| RSEVM | = 1.5400 | %rms | | | | | |
| Channel Power | = 39,444 | dBm | | | | | |
| RS Tx. Power (Avg) | = 14,692 | dBm | | | | | |
| OFDM Sym. Tx. Power | = 39,467 | dBm | | | | | |
| RS Rx. Power (Avg) | = 14.692 | dBm | | | | | |
| RSSI | = 39,447 | dBm | | | | | |
| RS Rx. Quality | = -10.773 | dB | | | | | |
| Freq Err | = 5.6822 | Hz | | | | | |
| SyncCorr | = 99.885 | | using P-S | S | | | |
| Common Tracking Error | = 7.8426 | %rms | | | | | |
| SymClk Err | = 0.01226 | 6 ppm | | | | | |
| Time Offset | = 86.012 | usec | | | | | |
| Q Offset | = -62.381 | dB | | | | | |
| Q Gain Imbalance | = -0.007 | dB | | | | | |
| Q Quad. Error | = 39.757 | mdeg | | | | | |
| Q Timing Skew | = 41.932 | psec | | | | | |
| CP Length Mode | = Normal | auto) | | | | | |
| Cell ID | = 6 | (a | uto) | | | | |
| Cell D. Groun/Sector | = 2/0 | (auto) | | | STATUS. | | |

12.30.0



| | | Absolute Value Limit Frequency Δ (Hz) Δ (Hz) | Result |
|---------------------------------------|-----------------------|--|-----------------------|
| | | 6.05 1000 | Pass |
| | | | |
| Keysight LTE & LTE-A FDD - Modulation | Analysis | EXT REF 0911 | 10:39 PM Mar 18, 2022 |
| Carrier Ref Freg 2.15500 | | Carrier Ref Freq: 2.155000000 GHz | TRACE 12 14 |
| | | Trig: External1 Avg Hold: 100 % Direction #Atten: 32 dB (Elec 16) Ext Gain: -41.60 dB Num CC(| n: Downlink (5): 1 |
| Ch1 Error Summary (CC0) | | | |
| EVM | = 1.5823 | %rms at EVMWindow End | |
| EVM Pk | = 7.7306 | % at sym 25, subcar 77 | |
| Data EVM | = 1.5967 | %rms | |
| - 3GPP-defined QPSK EV | | %rms. | |
| - 3GPP-defined 16QAM E | | | |
| - 3GPP-defined 64QAM E RS EVM | = 1.5389 | %rms | |
| Channel Power | = 39.517 | dBm | |
| RS Tx. Power (Avg) | = 14.764 | dBm | |
| OFDM Sym. Tx. Power | = 39,537 | dBm | |
| RS Rx, Power (Avg) | = 14,764 | dBm | |
| RSSI | = 39.52 | dBm | |
| RS Rx. Quality | = -10.774 | dB | |
| Freq Err | = 6.0531 | Hz | |
| SyncCorr | = 99.888 | % using P-SS | |
| Common Tracking Error SymClk Err | = 6.7405 = 0.01132 | %rms | |
| Time Offset | = 86.012 | ppm usec | |
| IQ Offset | = -62.454 | dB | |
| IQ Gain Imbalance | = -0.007 | dB | |
| IO Quad. Error | = 26.589 | mdeg | |
| IQ Timing Skew | = 29,721 | psec | |
| CP Length Mode | = Normal(au | | |
| Cell ID | = 6 | (auto) | |
| Cell ID Group/Sector | = 2/0 | | |

Band 66, 2110 MHz - 2200 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 20° C Temperature Conditions, Mid CHannel 2155 MHz
Absolute Value
Limit
Frequency Δ (Hz)
A (Hz)
Result

| Keysight LTE & LTE-A FDD - Modulation An | ilysis | | | XT REF | | | | | 0 | 3:28:29 AM Mar 18, 1 |
|--|--------|------------|--------|----------------|------------------|-------|-------------------|--|---|----------------------|
| Carrier Ref Freq 2.155000 | 00 |) GHz | | Carri Trig: | er Ref Extern | al1 | 2.155000 c 16) | 000 GHz Avg Hold: 10 Ext Gain: -41 | | TRACE 121 |
| Ch1 Error Summary (CC0) | | | | | | | | | | |
| EVM | | 1.5753 | %rms | at | EVA | / Win | dow E | nd | | |
| EVM Pk | | 7.6928 | % | at | sym | 33, | subc | ar 149 | | |
| Data EVM | | 1.5935 | %rms | | | | | | | |
| - 3GPP-defined QPSK EVM | | 1.6099 | %rms | | | | | | | |
| - 3GPP-defined 16QAM EVM | 1= | | | | | | | | | |
| - 3GPP-defined 64QAM EVM | / = | | | | | | | | | |
| RS EVM | | 1,4977 | %rms | | | | | | | |
| Channel Power | | 39.543 | dBm | | | | | | | |
| RS Tx. Power (Avg) | | 14.787 | dBm | | | | | | | |
| OFDM Sym. Tx. Power | | 39,562 | dBm | | | | | | | |
| RS Rx. Power (Avg) | | 14.787 | dBm | | | | | | | |
| RSSI | | 39,542 | dBm | | | | | | | |
| RS Rx. Quality | | -10.774 | dB | | | | | | | |
| Freq Err | E | 5.7979 | Hz | | | | | | | |
| SyncCorr | | 99,923 | % | us | ng | P-SS | | | | |
| Common Tracking Error | | 5.9756 | %rms | | | | | | | |
| SymClk Err | | 0.00847 | ppm | | | | | | | |
| Time Offset | | 86.011 | usec | | | | | | | |
| IQ Offset | | -62.542 | dB | | | | | | | |
| IQ Gain Imbalance | | -0.007 | dB | | | | | | | |
| IQ Quad. Error | | 31.737 | mdeg | | | | | | | |
| IQ Timing Skew | E | 27,985 | psec | | | | | | | |
| CP Length Mode | | Normal(aut | o) | | | | | | | |
| Cell ID | | | | auto | | | | | | |
| Cell ID Groun/Sector | - | 2/0 | (auto) | | | | | | | |

12.30.0



| Band 66, 2110 MHz - 2 | 00 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 30° C Temperature Conditions, Mid CHannel Absolute Value Limit | 2155 MHz |
|---------------------------------------|--|----------|
| | Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result | |
| | | |
| | | |
| Keysight LTE & LTE-A FDD - Modulation | | |
| Carrier Ref Freg 2.15500 | 2015 EXT REF 2015500000 GHz 174ACL 17 | |
| | Fig: External1 Avg Hold: 100 % Direction: Downlink FiAten: 32 dB (Elec 16) Ext Gain: 416 ob B Num CC(5): 1 | |
| | | |
| Ch1 Error Summary (CC0) | | |
| EVM | = 1.5825 %/ms at EVMWindow End | |
| EVM Pk Data EVM | = 7.6654 % at sym 25, subcar -85 = 1.5972 %rms | |
| - 3GPP-defined OPSK EV | | |
| - 3GPP-defined 16QAM E | | |
| - 3GPP-defined 64QAM E | | |
| RS EVM | = 1.5473 %rms | |
| Channel Power | = 39.403 dBm | |
| RS Tx. Power (Avg) | = 14,644 dBm | |
| OFDM Sym. Tx. Power | = 39.422 dBm | |
| RS Rx, Power (Avg) | = 14.644 dBm | |
| RSSI RS Rx. Quality | = 39.401 dBm = -10.774 dB | |
| | | |
| Freq Err | = 5,3312 Hz | |
| SyncCorr Common Tracking Error | = 99.907 % using P-SS = 7.0590 %rms | |
| SymClk Err | = / 0590 %/ms | |
| Time Offset | = 86.012 usec | |
| IQ Offset | = -62.443 dB | |
| IQ Gain Imbalance | = -0.007 dB | |
| IQ Quad. Error | = 32.011 mdeg | |
| IQ Timing Skew | = 29.800 psec | |
| CP Length Mode | = Normal(auto) | |
| Cell ID | = 6 (auto) | |
| Cell ID Group/Sector | = 2/0 (auto) + | |
| MSG VAlready in Single, press F | start to initiate a new sweep or sequence. | |
| | | |
| Band 66, 2110 MHz - 2 | 00 MHz, LTE Single Carrier, Port 1, 5 MHz Bandwidth, QPSK Modulation, 48 VDC Nominal Voltage Conditions, 40° C Temperature Conditions, Mid CHannel Absolute Value Limit | 2155 MHz |
| | Absolute Value Limit Frequency Δ (Hz) Δ (Hz) Result | |
| [] | Frequency Δ (rz) Δ (rz) Result 5.33 1000 Pass | |

| Keysight LTE & LTE-A FDD - Modulation Ani RF 50 0 AC | elyses | | EXT REFI | | 03:45:38 AM Mar 19, 20 |
|---|--------------|--------|---|-----------------|-------------------------------------|
| Carrier Ref Freq 2.155000 | 000 GHz | | Carrier Ref Freq: 2.15500 Trig: External1 #Atten: 32 dB (Elec 16) | Avg Hold: 100 % | Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | |
| EVM | = 1.5825 | 5 %rms | at EVMWindow | End | |
| EVM Pk | = 7.6654 | . % | at sym 25, sub | car -85 | |
| Data EVM | = 1.5972 | 2 %rms | | | |
| - 3GPP-defined QPSK EVM | = 1.6123 | 3 %rms | | | |
| - 3GPP-defined 16QAM EVN | § = | | | | |
| - 3GPP-defined 64QAM EVM | 1 = | | | | |
| RS EVM | = 1.5473 | 3 %rms | | | |
| Channel Power | = 39,403 | 3 dBm | | | |
| RS Tx. Power (Avg) | = 14,644 | 4 dBm | | | |
| OFDM Sym. Tx. Power | = 39,422 | 2 dBm | | | |
| RS Rx. Power (Avg) | = 14.644 | dBm | | | |
| RSSI | = 39.401 | dBm | | | |
| RS Rx. Quality | = -10.77 | 4 dB | | | |
| Freq Err | = 5.3312 | 2 Hz | | | |
| SyncCorr | = 99,907 | | using P-SS | | |
| Common Tracking Error | = 7.0590 |) %rms | | | |
| SymClk Err | = 0.0147 | | | | |
| Time Offset | = 86.012 | | | | |
| IQ Offset | = -62.44 | | | | |
| IQ Gain Imbalance | = -0.007 | | | | |
| IQ Quad. Error | = 32.011 | | | | |
| IQ Timing Skew | = 29.800 |) psec | | | |
| CP Length Mode | = Norma | | | | |
| Cell ID Cell ID Group/Sector | = 6 = 2/0 | | (auto) | | |

OMit 2020.12.30.0



| | | | | olute Value ency ∆ (Hz) | Limit ∆ (Hz) | Result | |
|---------------------------------------|------------------------|-------------------|--------------------|------------------------------|---------------------------|--------------------------|--|
| | | | | 5.64 | 1000 | Pass | <u> </u> |
| | | | | | | | |
| Keysight LTE & LTE-A FDD - Modulation | | EXT REF | | | | 04:29:39 AM Mar 19, 2022 | 2 |
| Carrier Ref Freq 2.15500 | | | Ref Freq: 2.155000 | 000 GHz Avg Hold: 100 % | | TRACE 12345 | a |
| | | | 32 dB (Elec 16) | | | CC(s): 1 | 6 |
| Ch1 Error Summary (CC0) | | | | | | | |
| EVM | = 1.5772 | %rms at 1 | EVM Window E | nd | | | |
| EVM Pk | = 8.0566 | | sym 25, subca | | | | |
| Data EVM | = 1.5944 | %rms | | | | | |
| - 3GPP-defined QPSK EV | | %rms | | | | | |
| - 3GPP-defined 16QAM E | | | | | | | |
| - 3GPP-defined 640AM E RS EVM | /M = = 1.5257 | %rms | | | | | |
| Channel Power | = 39.48 | dBm | | | | | |
| RS Tx, Power (Avg) | = 14.725 | dBm | | | | | |
| OFDM Sym. Tx. Power | = 39.5 | dBm | | | | | |
| RS Rx, Power (Avg) | = 14,725 | dBm | | | | | |
| RSSI | = 39.48 | dBm | | | | 1 | |
| RS Rx. Quality | = -10.774 | dB | | | | | |
| Freq Err | = 5.6384 | Hz | | | | | |
| SyncCorr | = 99.911 | % using | g P-SS | | | | |
| Common Tracking Error | = 7.8583 | %rms | | | | | |
| SymClk Err Time Offset | = 0.01300 = 86.012 | ppm | | | | | |
| IQ Offset | = -62,483 | usec dB | | | | | |
| IQ Gain Imbalance | = -0.007 | dB | | | | | |
| IQ Quad. Error | = 34.603 | mdeg | | | | | |
| IQ Timing Skew | = 35.856 | psec | | | | | |
| CP Length Mode | = Normal(au | to) | | | | | |
| Cell ID | = 6 | (auto) | | | | | |
| Cell ID Group/Sector | | (auto) | | | | - | - |
| MsG 🧼 Already in Single, press F | estart to initiate a r | lew sweep or seq | uence E | STATUS | | | |
| | | | | | | | |
| Band 66, 2110 MHz - 22 | 00 MHz, LTE Sing | gle Carrier, Port | | idth, QPSK Mo olute Value | dulation, 40.8 \ Limit | VDC Extreme Low | v Voltage Conditions, 20° C Temperature Conditions, Mid CHannel 2155 MHz |
| | | | | ency Δ (Hz) | Δ (Hz) | Result | |
| | | | | 5.08 | Δ (ΠZ) | Result | |

| Keysight LTE & LTE-A FDD - Modulation An | advaca | Ð | (T REF | | 03:16:39 AM Mar 18, 20 |
|--|------------|--------|--|-----------------|---|
| Carrier Ref Freq 2.155000 | 000 GHz | | Carrier Ref Freq: 2.1550 Trig: External1 #Atten: 32 dB (Elec 16) | Avg Hold: 100 % | TRACE 1200 Direction: Downlink Num CC(s): 1 |
| Ch1 Error Summary (CC0) | | | | | |
| EVM | = 1.5657 | %rms | at EVM Window | End | |
| EVM Pk | = 8,1057 | | at sym 25, sub | car 46 | |
| Data EVM | = 1.5786 | %rms | | | |
| - 3GPP-defined QPSK EVM | = 1.5966 | %rms | | | |
| - 3GPP-defined 16QAM EVM | M = | | | | |
| - 3GPP-defined 64QAM EVM | / = | | | | |
| RS EVM | = 1.5078 | %rms | | | |
| Channel Power | = 39,623 | dBm | | | |
| RS Tx. Power (Avg) | = 14.876 | dBm | | | |
| OFDM Sym. Tx. Power | = 39,649 | dBm | | | |
| RS Rx. Power (Avg) | = 14.876 | dBm | | | |
| RSSI | = 39.634 | dBm | | | |
| RS Rx. Quality | = -10.775 | dB | | | |
| Freq Err | = 5.0773 | Hz | | | |
| SyncCorr | = 99.925 | | using P-SS | | |
| Common Tracking Error | = 6,4553 | %rms | | | |
| SymClk Err | = 0.01255 | ppm | | | |
| Time Offset | = 86.011 | usec | | | |
| IQ Offset | = -62.602 | dB | | | |
| IQ Gain Imbalance | = -0.007 | dB | | | |
| IQ Quad. Error | = 35.226 | mdeg | | | |
| IQ Timing Skew | = 30.953 | psec | | | |
| CP Length Mode | = Normal(a | uto) | | | |
| Cell ID | = 6 | | auto) | | |
| Cell ID Group/Sector | = 2/0 | (auto) | | | |
| ISG . | | | | STATUS | |

OMR 2020.12.30.0

all ID = 6 all ID Group/Sector = 2/0 (autr Already in Single, press Restart to initiate a new s



| | | Absolute Value Frequency Δ (Hz) | Limit ∆ (Hz) Result | |
|---------------------------------------|------------|--|---|----|
| | | 3.7 | 1000 Pass | Ţ |
| | | | | |
| Keysight LTE & LTE-A FDD - Modulation | | | | |
| (A) [RE] 50 Ω 4C | | EXT REF Carrier Ref Freq: 2.165000000 GHz | 03:21:06 AM Mar 18, 202 TRACE 2 2 10 | 22 |
| Carrier Ref Freq 2.15500 | 00000 GHz | Trig: External1 Avg Hold: 100 % | Direction: Downlink | |
| | | #Atten: 32 dB (Elec 16) Ext Gain: -41.60 | iB Num CC(s): 1 | |
| Ch1 Error Summary (CC0) | | | | |
| EVM | = 1.5682 | %rms at EVMWindow End | | |
| EVM Pk | = 7.8846 | % at sym 25, subcar -85 | | |
| Data EVM | = 1.5875 | %rms | | |
| - 3GPP-defined QPSK EV | M = 1.6053 | %rms | | |
| - 3GPP-defined 16QAM E | /M = | | | |
| - 3GPP-defined 64QAM E | = MV | | | |
| RS EVM | = 1,5082 | %rms | | |
| Channel Power | = 39,565 | dBm | | |
| RS Tx. Power (Avg) | = 14.813 | dBm | | |
| OFDM Sym. Tx. Power | = 39,585 | dBm | | |
| RS Rx. Power (Avg) | = 14,813 | dBm | | - |
| RSSI | = 39,568 | dBm | | |
| RS Rx. Quality | = -10,774 | dB | | |
| Freq Err | = 3.7035 | Hz | | |
| SyncCorr | = 99,922 | % using P-SS | | |
| Common Tracking Error | = 4.7624 | %rms | | |
| SymClk Err | = 0.01177 | ppm | | |
| Time Offset | = 86.011 | usec | | |
| IQ Offset | = -62.568 | dB | | |
| IQ Gain Imbalance | = -0.006 | dB | | |
| IQ Quad. Error | = 28.636 | mdeg | | |
| IQ Timing Skew | = 32,145 | psec | | |

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