ZTETS

Agilent LTE TDD - Modulation Analysis

| LXI | T | RF | 50 Ω | AC | | | SENSE:EXT | | ALIGN AUTO | 08:53:13 AM Oct 11, 2014 | TRACE 1 2 3 4 |

Center Freq **2.605000000 GHz**
Trig: Free Run
Range: 20.00 dBm   Ext Gain: -36.80 dB

Avg|Off
Direction: Downlink
BW: 20 MHz(100 RB)

Layer0 OFDM Meas
300 m/div **Ref 0**
I-Q
1.2
900m
600m
300m
0
-300m
-600m
-900m
-1.2
-2.535   2.5347
Res BW 15 kHz   TimeLen 280 Sym

Layer0 OFDM Err Vect Spectrum
500 m%/div Ref 0 %
Mag
4.5
4
3.5
3
2.5
2
1.5
1
500m
Start -600 carrier   Stop 600 carrier
Res BW 15 kHz   TimeLen 280 Sym

Ch1 Spectrum
15 dB/div **Ref 15 dBm**
Log
0
-15
-30
-45
-60
-75
-90
-105
-120
Center 2.605 GHz   Span 24 MHz
Res BW 190.968 Hz   TimeLen 20 ms

Ch1 Error Summary

EVM	= 4.0271	%rms	at
EVM Pk	= 14.595	%	at
Data EVM	= 4.0275	%rms	
- 3GPP-defined QPSK EVM	= 5.1310	%rms	
- 3GPP-defined 16QAM EVM	= 3.2209	%rms	
- 3GPP-defined 64QAM EVM	= ---		
RS EVM	= 4.0301	%rms	
RS Tx. Power (Avg)	= 9.588	dBm	
OFDM Sym. Tx. Power	= 40.052	dBm	
RS Rx. Power (Avg)	= 9.588	dBm	
RS Rx. Quality	= -10.635	dB	
Freq Err	= -698.05	mHz	
SyncCorr	= 99.638	%	usi

MSG   STATUS

Frequency

Center Freq
2.605000000 GHz

Start Freq
2.593000000 GHz

Stop Freq
2.617000000 GHz

CF Step
5.000000 MHz
Auto   Man

ZTETS

Agilent LTE TDD - Modulation Analysis

| LXI | T | RF | 50 Ω | AC | | | SENSE:EXT | | ALIGN AUTO | 09:08:14 AM Oct 11, 2014 | TRACE 1 2 3 4 |

Center Freq 2.605000000 GHz

Trig: Free Run
Range: 20.00 dBm

Avg|Off

Direction: Downlink
Ext Gain: -36.80 dB   BW: 20 MHz(100 RB)

Layer0 OFDM Meas

300 m/div Ref 0
I-Q
1.2
900m
600m
300m
0
-300m
-600m
-900m
-1.2

-2.535   2.5347
Res BW 15 kHz   TimeLen 280 Sym

Layer0 OFDM Err Vect Spectrum

500 m%/div Ref 0 %
Mag
4.5
4
3.5
3
2.5
2
1.5
1
500m

Start -600 carrier   Stop 600 carrier
Res BW 15 kHz   TimeLen 280 Sym

Ch1 Spectrum

15 dB/div Ref 15 dBm
Log
0
-15
-30
-45
-60
-75
-90
-105
-120

Center 2.605 GHz   Span 24 MHz
Res BW 190.968 Hz   TimeLen 20 ms

Ch1 Error Summary

EVM	= 4.2296	%rms	at
EVM Pk	= 16.811	%	at
Data EVM	= 4.2814	%rms	
- 3GPP-defined QPSK EVM	= 3.6150	%rms	
- 3GPP-defined 16QAM EVM	= 4.0171	%rms	
- 3GPP-defined 64QAM EVM =	---		
RS EVM	= 3.8752	%rms	
RS Tx. Power (Avg)	= 9.476	dBm	
OFDM Sym. Tx. Power	= 39.996	dBm	
RS Rx. Power (Avg)	= 9.476	dBm	
RS Rx. Quality	= -10.688	dB	
Freq Err	= 47.923	mHz	
SyncCorr	= 99.754	%	usi

MSG   STATUS

Frequency

Center Freq
2.605000000 GHz

Start Freq
2.593000000 GHz

Stop Freq
2.617000000 GHz

CF Step
5.000000 MHz
Auto   Man

Agilent LTE TDD - Modulation Analysis

| LXI | T | RF | 50 Ω | AC | | SENSE:EXT | | ALIGN AUTO | 02:40:43 PM Oct 10, 2014 |

Center Freq 2.550000000 GHz
Avg|Off
Trig: Free Run
Range: 20.00 dBm   Ext Gain: -36.80 dB
TRACE 1 2 3 4
Direction: Downlink
BW: 20 MHz(100 RB)

Layer0 OFDM Meas
300 m/div **Ref 0**
I-Q
-2.535   2.5347
Res BW 15 kHz   TimeLen 280 Sym

Layer0 OFDM Err Vect Spectrum
500 m%/div **Ref 0 %**
Mag
Start -600 carrier   Stop 600 carrier
Res BW 15 kHz   TimeLen 280 Sym

Ch1 Spectrum
15 dB/div **Ref 15 dBm**
Log
Center 2.55 GHz   Span 24 MHz
Res BW 190.968 Hz   TimeLen 20 ms

Ch1 Error Summary

EVM	= 3.5905	%rms	at
EVM Pk	= 14.685	%	at
Data EVM	= 3.5915	%rms	
- 3GPP-defined QPSK EVM	= ---		
- 3GPP-defined 16QAM EVM	= ---		
- 3GPP-defined 64QAM EVM	= 3.1418	%rms	
RS EVM	= 3.6959	%rms	
RS Tx. Power (Avg)	= 9.234	dBm	
OFDM Sym. Tx. Power	= 40.073	dBm	
RS Rx. Power (Avg)	= 9.234	dBm	
RS Rx. Quality	= -10.794	dB	
Freq Err	= -2.1292	Hz	
SyncCorr	= 99.673	%	usi

Frequency

Center Freq
2.550000000 GHz

Start Freq
2.538000000 GHz

Stop Freq
2.562000000 GHz

CF Step
5.000000 MHz
Auto   Man

MSG   STATUS

ZTETS

Agilent LTE TDD - Modulation Analysis

| LXI | T | RF | 50 Ω | AC | | SENSE:EXT | | ALIGN AUTO | 09:00:38 AM Oct 11, 2014 |

Center Freq 2.625000000 GHz

Avg|Off   TRACE 1 2 3 4

Trig: Free Run   Direction: Downlink
Range: 20.00 dBm   Ext Gain: -36.80 dB   BW: 20 MHz(100 RB)

Layer0 OFDM Meas

300 m/div **Ref 0**
I-Q
1.2
900m
600m
300m
0
-300m
-600m
-900m
-1.2

-2.535   2.5347
Res BW 15 kHz   TimeLen 280 Sym

Layer0 OFDM Err Vect Spectrum

500 m%/div Ref 0 %
Mag
4.5
4
3.5
3
2.5
2
1.5
1
500m

Start -600 carrier   Stop 600 carrier
Res BW 15 kHz   TimeLen 280 Sym

Ch1 Spectrum

15 dB/div **Ref 15 dBm**
Log
0
-15
-30
-45
-60
-75
-90
-105
-120

Center 2.625 GHz   Span 24 MHz
Res BW 190.968 Hz   TimeLen 20 ms

Ch1 Error Summary

EVM	= 4.1203	%rms	at
EVM Pk	= 16.357	%	at
Data EVM	= 4.1149	%rms	
- 3GPP-defined QPSK EVM	= 5.2580	%rms	
- 3GPP-defined 16QAM EVM	= 3.2805	%rms	
- 3GPP-defined 64QAM EVM	= ---		
RS EVM	= 4.1024	%rms	
RS Tx. Power (Avg)	= 9.038	dBm	
OFDM Sym. Tx. Power	= 39.443	dBm	
RS Rx. Power (Avg)	= 9.038	dBm	
RS Rx. Quality	= -10.635	dB	
Freq Err	= -1.2209	Hz	
SyncCorr	= 99.784	%	usi

Frequency

Center Freq
2.625000000 GHz

Start Freq
2.613000000 GHz

Stop Freq
2.637000000 GHz

CF Step
5.000000 MHz
Auto   Man

MSG   STATUS

Agilent LTE TDD - Modulation Analysis

| | T | RF | 50 Ω | AC | | | SENSE:EXT | | ALIGN AUTO | 02:52:54 PM Oct 11, 2014 |

Center Freq 2.660000000 GHz

Trig: Free Run
Range: 20.00 dBm

Avg|Off

TRACE 1 2 3 4

Direction: Downlink
Ext Gain: -36.80 dB   BW: 20 MHz(100 RB)

Layer0 OFDM Meas

300 m/div Ref 0
I-Q
1.2
900m
600m
300m
0
-300m
-600m
-900m
-1.2

-2.535   2.5347
Res BW 15 kHz   TimeLen 280 Sym

Layer0 OFDM Err Vect Spectrum

500 m%/div Ref 0 %
Mag
4.5
4
3.5
3
2.5
2
1.5
1
500m

Start -600 carrier   Stop 600 carrier
Res BW 15 kHz   TimeLen 280 Sym

Ch1 Spectrum

15 dB/div Ref 15 dBm
Log
0
-15
-30
-45
-60
-75
-90
-105
-120

Center 2.66 GHz   Span 24 MHz
Res BW 190.968 Hz   TimeLen 20 ms

Ch1 Error Summary

EVM	= 4.1354	%rms	at
EVM Pk	= 16.600	%	at
Data EVM	= 4.1472	%rms	
- 3GPP-defined QPSK EVM	= 5.2927	%rms	
- 3GPP-defined 16QAM EVM	= 3.3373	%rms	
- 3GPP-defined 64QAM EVM	= ---		
RS EVM	= 4.0692	%rms	
RS Tx. Power (Avg)	= 9.116	dBm	
OFDM Sym. Tx. Power	= 39.581	dBm	
RS Rx. Power (Avg)	= 9.116	dBm	
RS Rx. Quality	= -10.637	dB	
Freq Err	= 217.20	mHz	
SyncCorr	= 99.761	%	usi

Frequency

Center Freq
2.660000000 GHz

Start Freq
2.648000000 GHz

Stop Freq
2.672000000 GHz

CF Step
5.000000 MHz
Auto   Man

MSG   STATUS

7 OCCUPIED BANDWIDTH

Applicable Standard: FCC §2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY51240300	2013.12.10	2014.12.10
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2014.06.13	2015.06.13

*statement of traceability: ZTE Corporation Reliability Testing Center attests that all calibration has been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

The RF out of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. 99%Power bandwidth was recorded.

Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	53%
ATM Pressure:	1009mbar

Test Result: Pass

Test Mode: Transmitting LTE

Test Data

Channel Bandwidth: 20M+20M

Port	Carrier Freq. c1+c2(MHz)	Occupied Bandwidth(MHz)		
		QPSK	**16QAM**	**64QAM**
1		37.891	37.519	37.337
2	2550+2570	37.892	37.519	37.337
3		37.892	37.520	37.337
4		37.892	37.519	37.337
1		37.086	37.512	37.339
2	2605+2625	37.087	37.512	37.339
3		37.086	37.512	37.339
4		37.086	37.512	37.339
1		37.072	37.500	37.335
2	2660+2680	37.072	37.502	37.333
3		37.075	37.504	37.336
4		37.072	37.504	37.330

Agilent Spectrum Analyzer - Occupied BW

LXI	T	RF	50 Ω	AC		SENSE:EXT	ALIGN AUTO	09:50:54 AM Oct 10, 2014

Center Freq 2.560000000 GHz
Gate: LO
#IFGain:Low

Center Freq: 2.560000000 GHz   Radio Std: None
Trig: Free Run   Avg|Hold:>10/10
#Atten: 20 dB   Ext Gain: -36.80 dB   Radio Device: BTS

Frequency

10 dB/div   Ref 40.00 dBm
Log

30.0
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0

Center 2.56 GHz   Span 50 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 6.2 ms

Center Freq
2.560000000 GHz

CF Step
5.000000 MHz
Auto   Man

Occupied Bandwidth	Total Power	42.4 dBm
37.891 MHz		
Transmit Freq Error	62.655 kHz	OBW Power	99.00 %
x dB Bandwidth	38.34 MHz	x dB	-26.00 dB

Freq Offset
0 Hz

MSG   STATUS

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.560000000 GHz
Gate: LO
#IFGain:Low

Center Freq: 2.560000000 GHz
Trig: Free Run
#Atten: 20 dB

Avg|Hold: 9/10
Ext Gain: -36.80 dB

Radio Std: None
Radio Device: BTS

10:41:34 AM Oct 10, 2014

SENSE:EXT   ALIGN AUTO

Frequency

10 dB/div   Ref 40.00 dBm
Log
30.0
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0

Center 2.56 GHz
#Res BW 100 kHz   #VBW 300 kHz

Span 50 MHz
Sweep 6.2 ms

Center Freq
2.560000000 GHz

CF Step
5.000000 MHz
Auto   Man

Occupied Bandwidth
37.519 MHz

Total Power   42.6 dBm

Transmit Freq Error   -10.520 kHz
x dB Bandwidth   38.22 MHz

OBW Power   99.00 %
x dB   -26.00 dB

Freq Offset
0 Hz

MSG   STATUS

ZTETS

ZTETS

Agilent Spectrum Analyzer - Occupied BW

| LXI | T | RF | 50 Ω | AC | | SENSE:EXT | | ALIGN AUTO | 10:42:00 AM Oct 10, 2014 |

Center Freq 2.560000000 GHz
Gate: LO
#IFGain:Low

Center Freq: 2.560000000 GHz
Trig: Free Run   Avg|Hold: 9/10
#Atten: 20 dB   Ext Gain: -36.80 dB

Radio Std: None
Radio Device: BTS

10 dB/div   Ref 40.00 dBm
Log
30.0
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0

Center 2.56 GHz
#Res BW 100 kHz   #VBW 300 kHz

Span 50 MHz
Sweep 6.2 ms

Occupied Bandwidth		Total Power	42.1 dBm
37.520 MHz			
Transmit Freq Error	-9.847 kHz	OBW Power	99.00 %
x dB Bandwidth	38.22 MHz	x dB	-26.00 dB

Frequency

Center Freq
2.560000000 GHz

CF Step
5.000000 MHz
Auto   Man

Freq Offset
0 Hz

MSG   STATUS

ZTETS

Agilent Spectrum Analyzer - Occupied BW

T	RF	50 Ω	AC	SENSE EXT	ALIGN AUTO	10:14:10 AM Oct 10, 2014

Center Freq 2.560000000 GHz

Center Freq: 2.560000000 GHz
Trig: Free Run   Avg|Hold: 10/10
#IFGain:Low   #Atten: 20 dB   Ext Gain: -36.80 dB

Radio Std: None
Radio Device: BTS

Gate: LO

10 dB/div   **Ref 40.00 dBm**
Log

30.0
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0

Center 2.56 GHz   Span 50 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 6.2 ms

Occupied Bandwidth   Total Power   42.6 dBm
            37.337 MHz

Transmit Freq Error   -28.950 kHz   OBW Power   99.00 %

x dB Bandwidth   38.25 MHz   x dB   -26.00 dB

Recall

State ▶

Trace
(+ State)

Data
(Import) ▶
Trace 1

ZTETS