

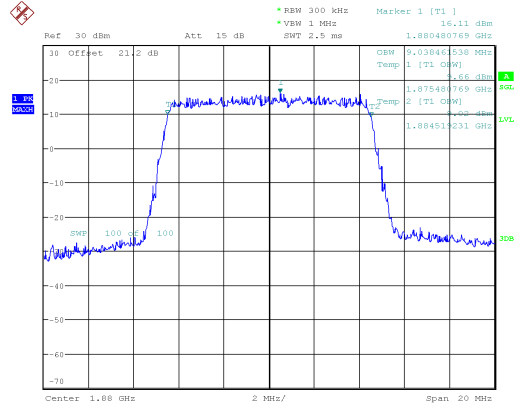




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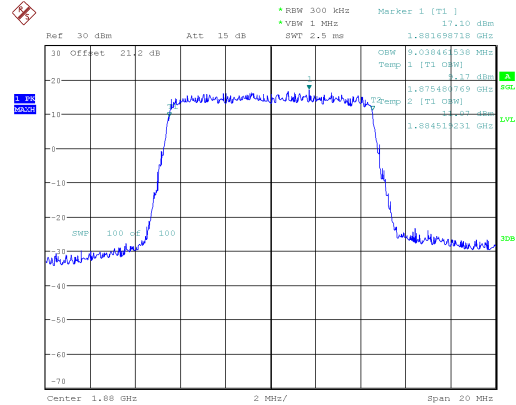
FCC RF TEST REPORT

FDD-LTE 2 BW10MHz Channel18900 RB50 16-QAM



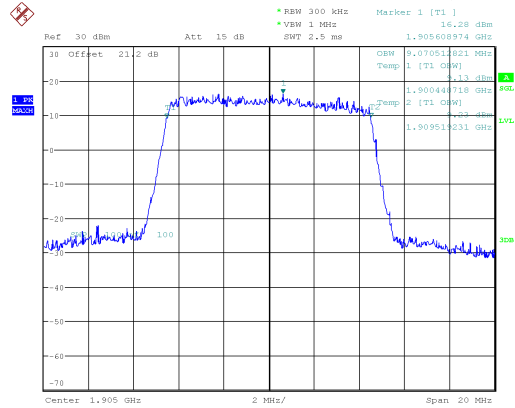
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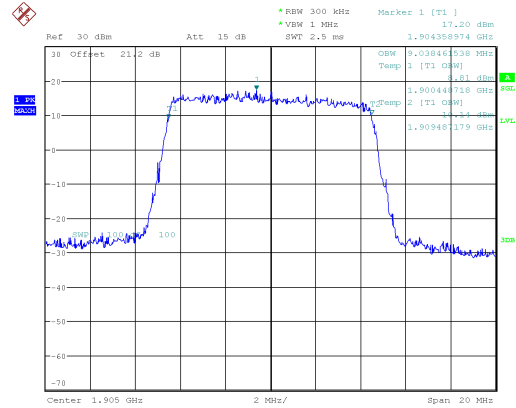
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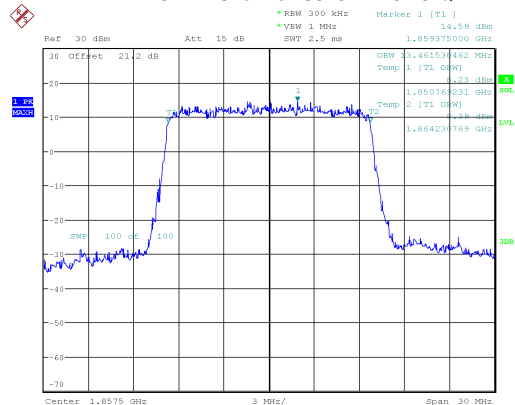
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FDD-LTE 2 BW10MHz Channel19150 RB50 QPSK



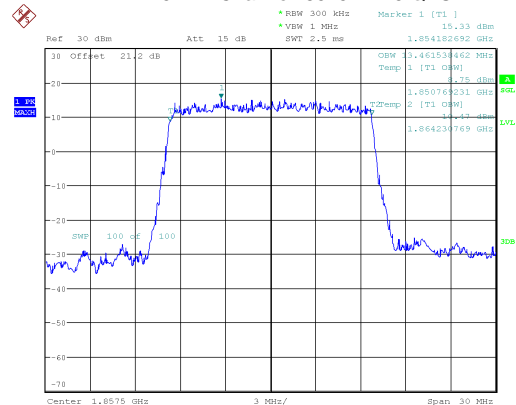
Date: 4.APR.6302 04:01:32

FDD-LTE 2 BW15MHz Channel18675 RB75 16-QAM



Date: 4.APR.6302 04:08:15

FDD-LTE 2 BW15MHz Channel18675 RB75 QPSK



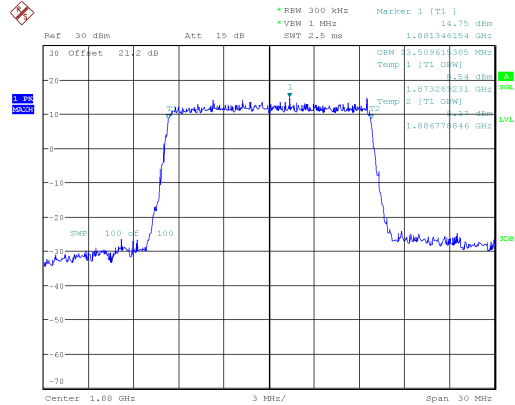
Date: 4.APR.6302 04:08:05



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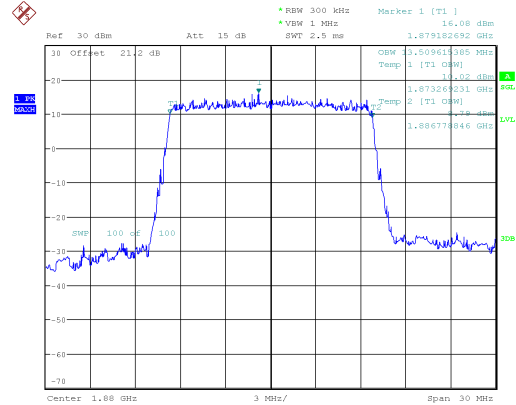
FCC RF TEST REPORT

FDD-LTE 2 BW15MHz Channel18900 RB75 16-QAM



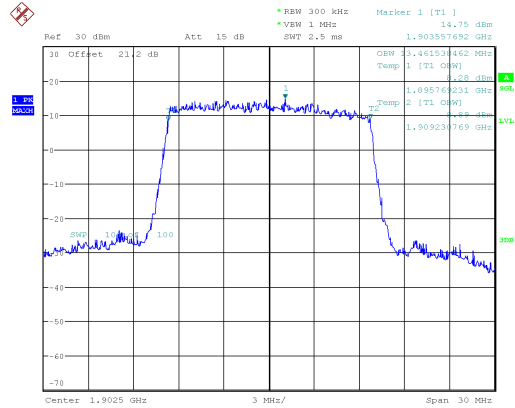
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FDD-LTE 2 BW15MHz Channel18900 RB75 QPSK



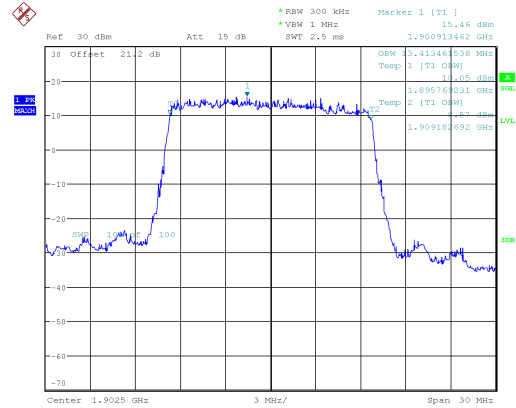
Date: 4.APR.6302 04:13:39

FDD-LTE 2 BW15MHz Channel19125 RB75 16-QAM



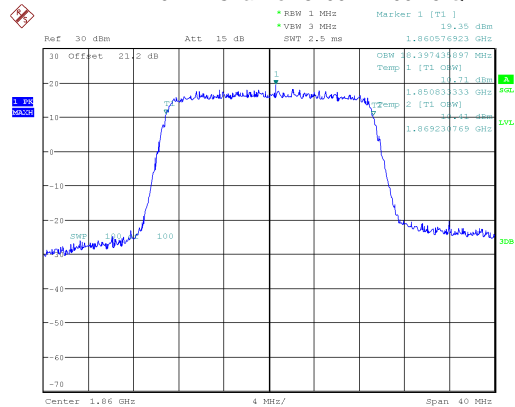
Date: 4.APR.6302 04:17:29

FDD-LTE 2 BW15MHz Channel19125 RB75 QPSK



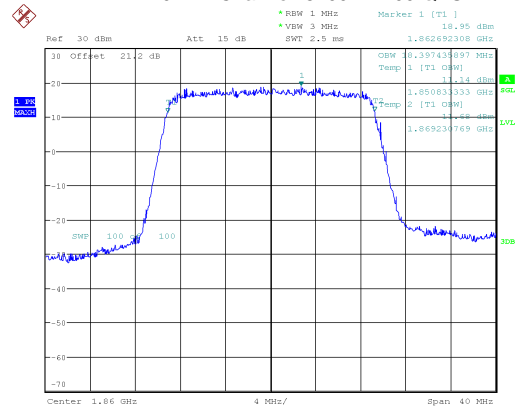
Date: 4.APR.6302 04:17:20

FDD-LTE 2 BW20MHz Channel18700 RB100 16-QAM



Date: 4.APR.6302 04:24:08

FDD-LTE 2 BW20MHz Channel18700 RB100 QPSK



Date: 4.APR.6302 04:23:59

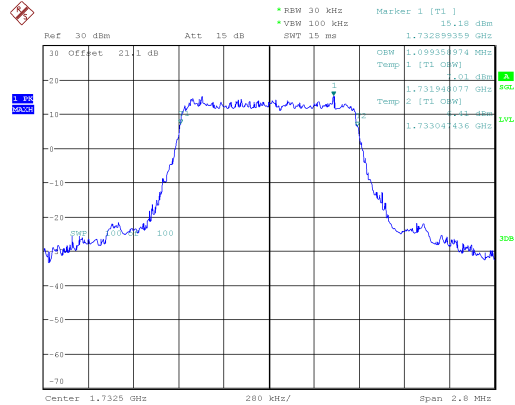




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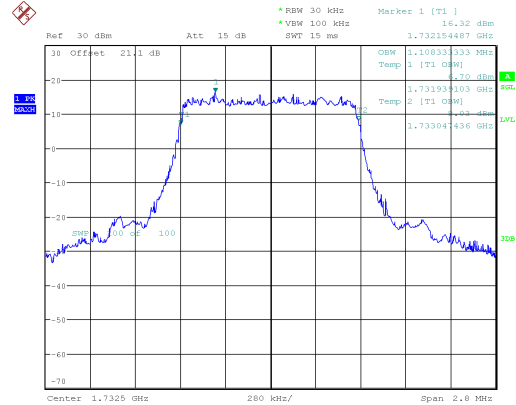
# FCC RF TEST REPORT

## FDD-LTE 4 BW1.4MHz Channel20175 RB6 16-QAM



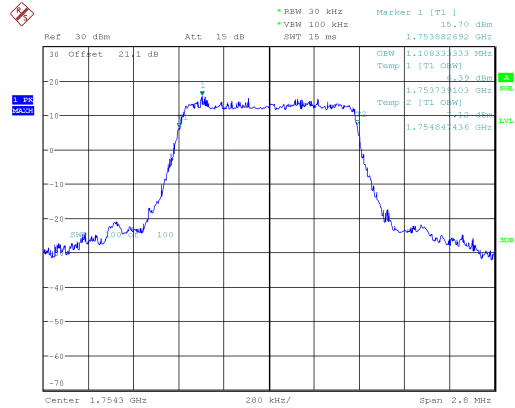
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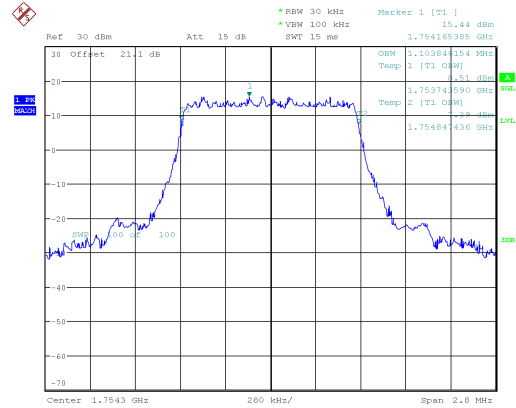
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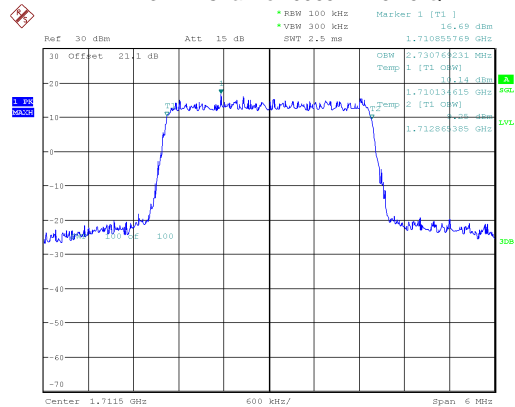
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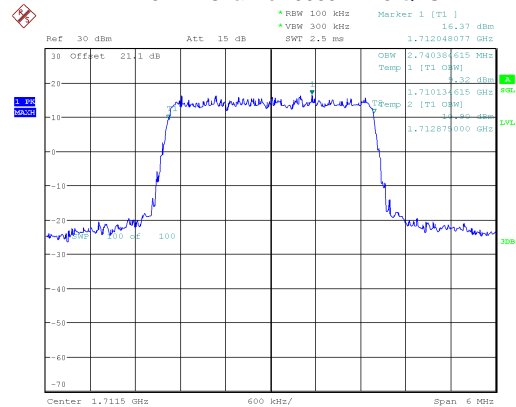
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Date: 4.APR.6302 04:55:49

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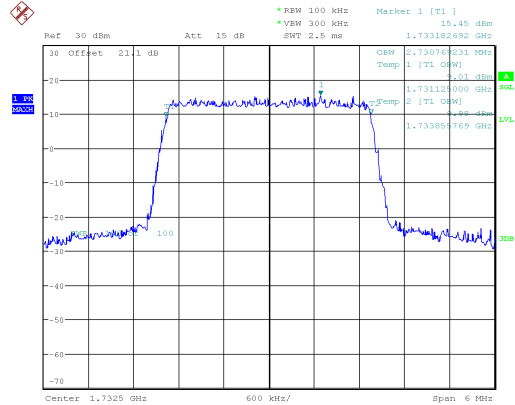
Date: 4.APR.6302 04:55:38



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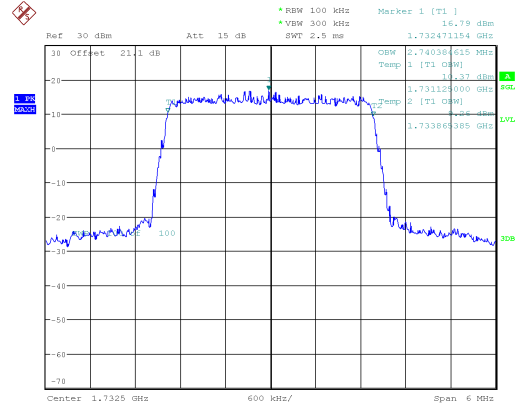
# FCC RF TEST REPORT

## FDD-LTE 4 BW3MHz Channel20175 RB15 16-QAM



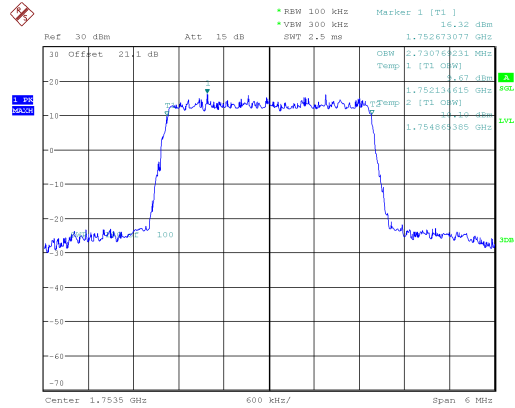
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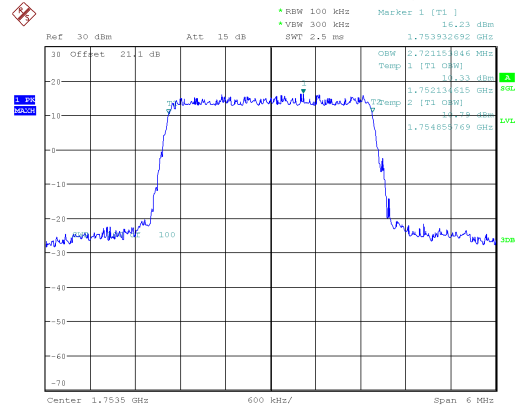
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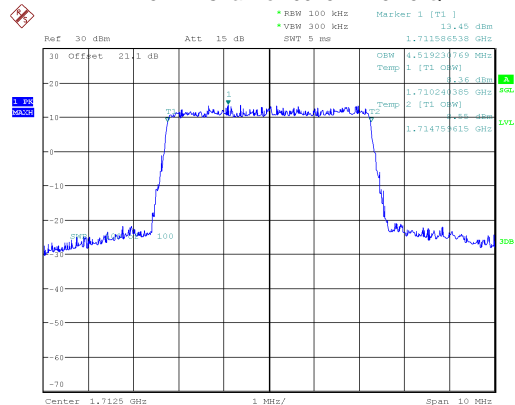
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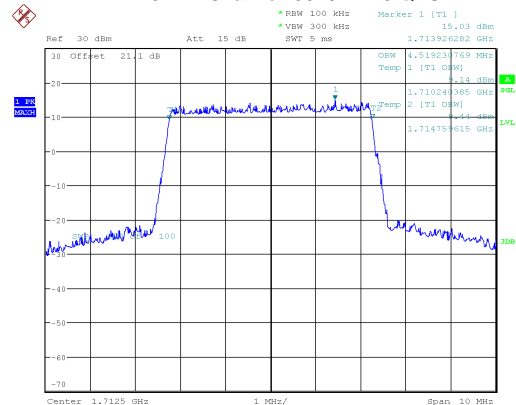
Date: 4.APR.6302 05:04:51

## FDD-LTE 4 BW5MHz Channel19975 RB25 16-QAM



Date: 4.APR.6302 05:11:39

## FDD-LTE 4 BW5MHz Channel19975 RB25 QPSK



Date: 4.APR.6302 05:11:27

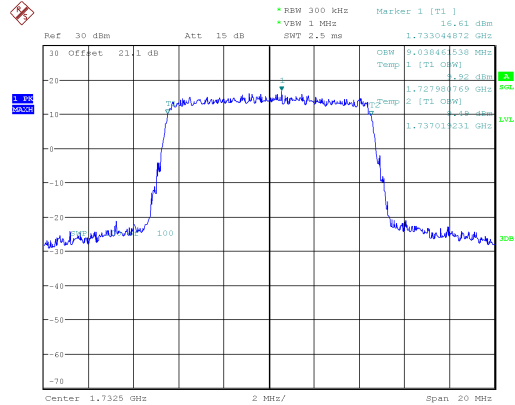




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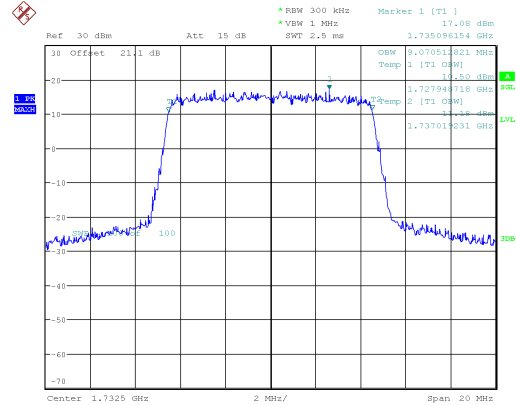
FCC RF TEST REPORT

FDD-LTE 4 BW10MHz Channel20175 RB50 16-QAM



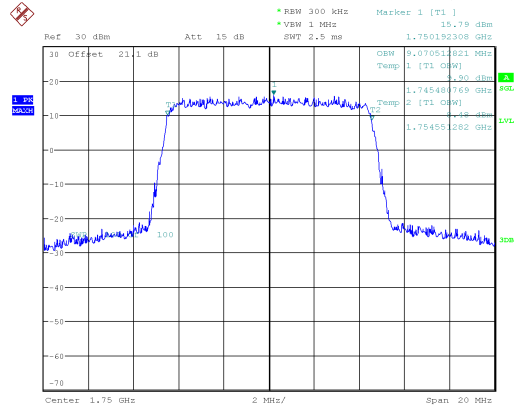
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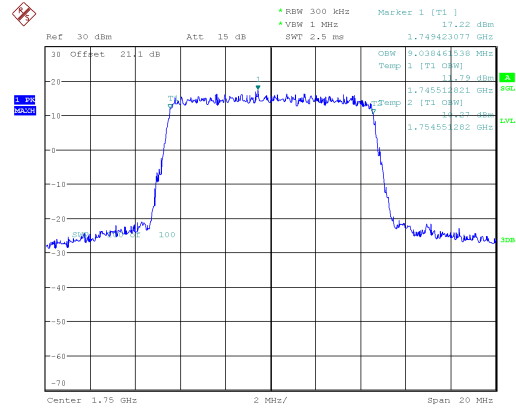
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FDD-LTE 4 BW10MHz Channel20350 RB50 16-QAM



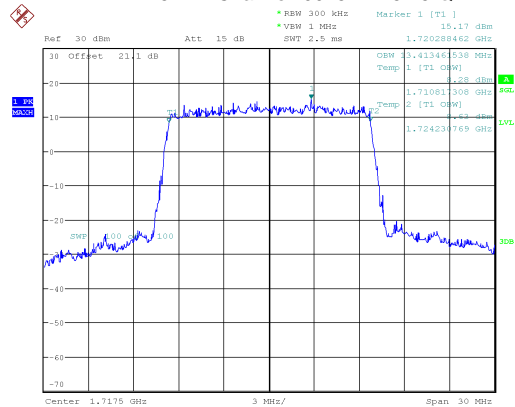
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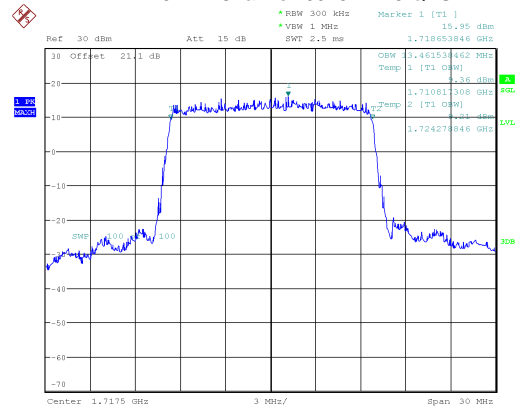
Date: 4.APR.6302 05:37:37

FDD-LTE 4 BW15MHz Channel20025 RB75 16-QAM



Date: 4.APR.6302 05:44:48

FDD-LTE 4 BW15MHz Channel20025 RB75 QPSK



Date: 4.APR.6302 05:44:38

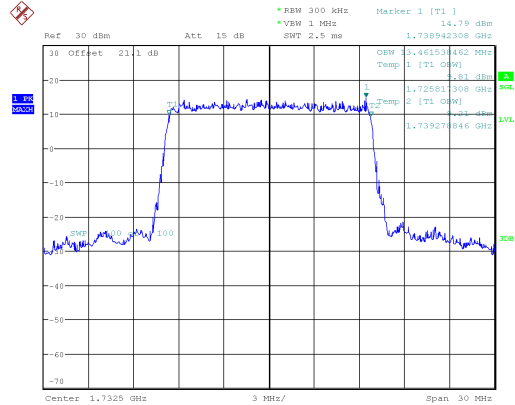




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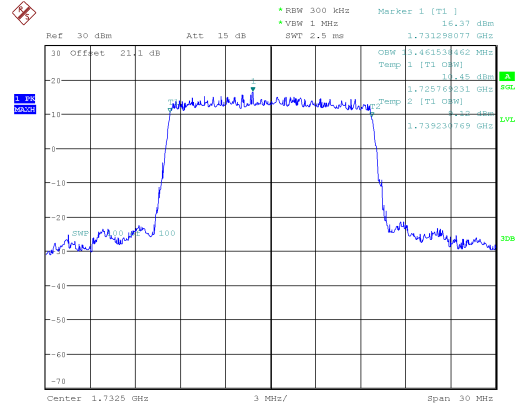
FCC RF TEST REPORT

FDD-LTE 4 BW15MHz Channel20175 RB75 16-QAM



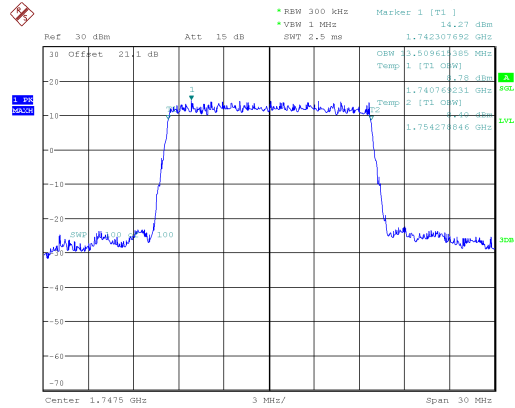
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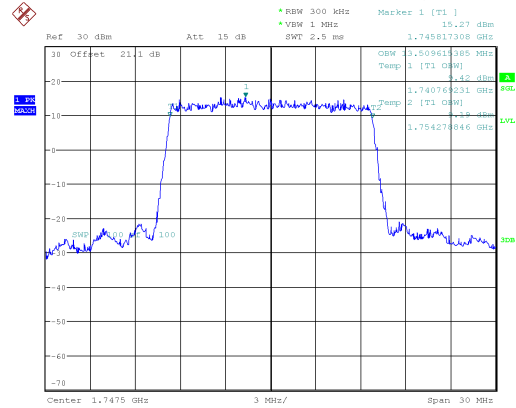
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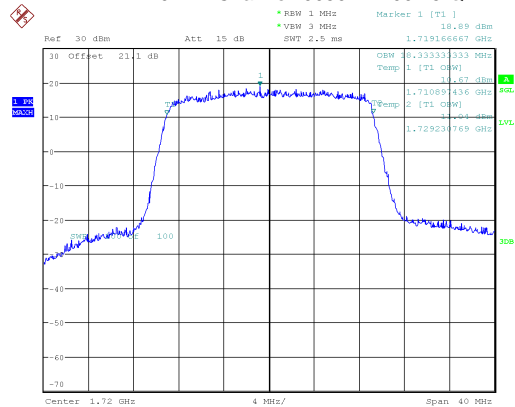
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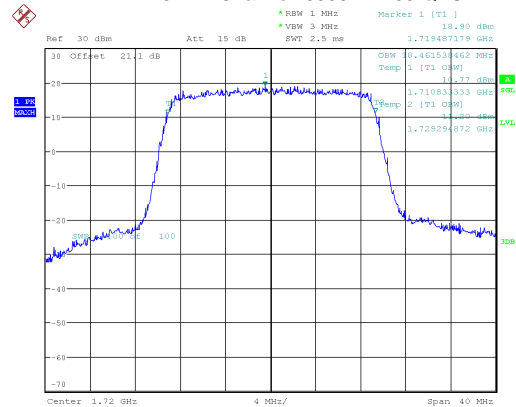
Date: 4.APR.6302 05:54:50

FDD-LTE 4 BW20MHz Channel20050 RB100 16-QAM



Date: 4.APR.6302 06:02:11

FDD-LTE 4 BW20MHz Channel20050 RB100 QPSK



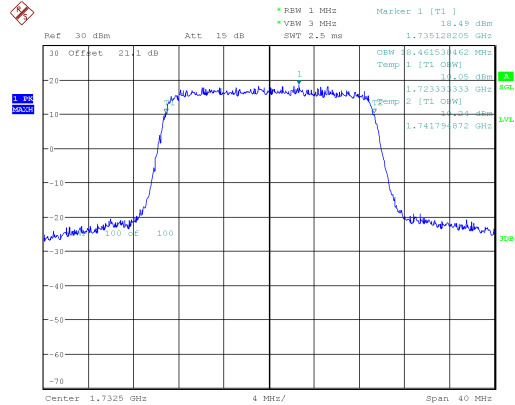
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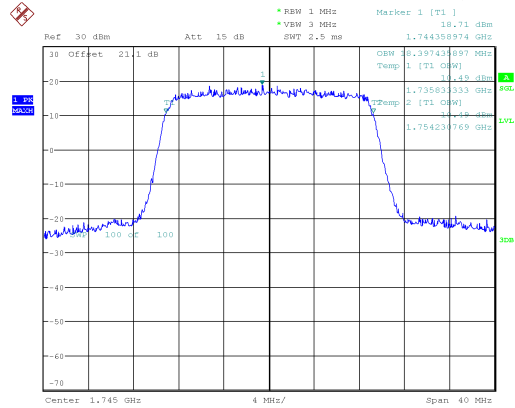
FCC RF TEST REPORT

### FDD-LTE 4 BW20MHz Channel20175 RB100 16-QAM



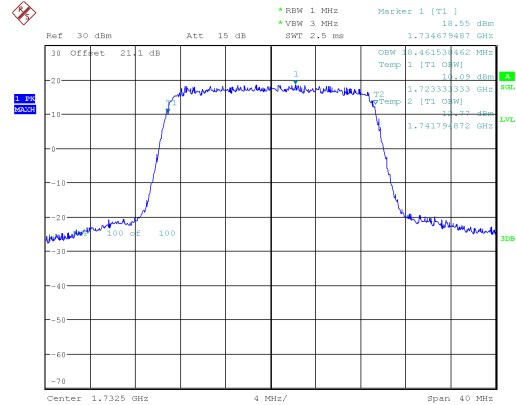
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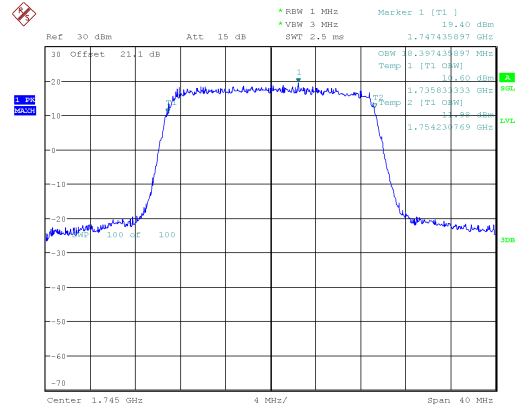
Date: 4.APR.6302 06:12:32

### FDD-LTE 4 BW20MHz Channel20175 RB100 QPSK



Date: 4.APR.6302 06:08:08

### FDD-LTE 4 BW20MHz Channel20300 RB100 QPSK



Date: 4.APR.6302 06:12:22



## 5.4 Band Edge

### 5.4.1 Description of Conducted Band Edge Measurement

22.917(a) for Band5.

For operations in the 824-849MHz band, the FCC limit is  $43+10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

24.238(a) for Band2, 25

For operations in the 1850-1910MHz band and 1930-1990MHz, the FCC limit is  $43+10\log_{10}(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(g) for Band12, 17

For operations in the 698-746MHz band, the FCC limit is  $43+10\log(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 100kHz bandwidth. However, in the 100kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30kHz may be employed.

27.53 (h) for Band4

For operations in the 1710-1755MHz band, the FCC limit is  $43+10\log(P[\text{Watts}])$  dB below the transmitter power  $P(\text{Watts})$  in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53 (m)(4) for FCC Band7, 41

For mobile digital stations, the attenuation factor shall be not less than  $40+10\log(P)$  dB on all frequencies between the channel edge and 5 MHz from the channel edge,  $43+10\log(P)$  dB on all frequencies between 5MHz and X MHz from the channel edge, and  $55+10\log(P)$  dB on all frequencies more than X MHz from the channel edge, where X is the greater of 6MHz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43+\log(P)$  dB on all frequencies between 2490.5MHz and 2496MHz and  $55+\log(P)$  dB at or below 2490.5MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.



#### 5.4.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

#### 5.4.3 Test Procedure

- a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- b. The band edges of low and high channels for the highest RF powers were measured.
- c. Set RBW $\geq$ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
- d. Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used and the measured power was integrated over the full required measurement bandwidth of 1 MHz.
- e. Set spectrum analyzer with RMS detector.
- f. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- g. Checked that all the results comply with the emission limit line.

Example:

The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [43 + 10\log(P)](dB) = -13dBm.$$

- h. For LTE Band7, the other 40 dB, and 55 dB have additionally applied same calculation above. The limit line is derived from  $40 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [40 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [40 + 10\log(P)](dB)$$

$$= -10dBm$$

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [55 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [55 + 10\log(P)](dB)$$

$$= -13dBm$$

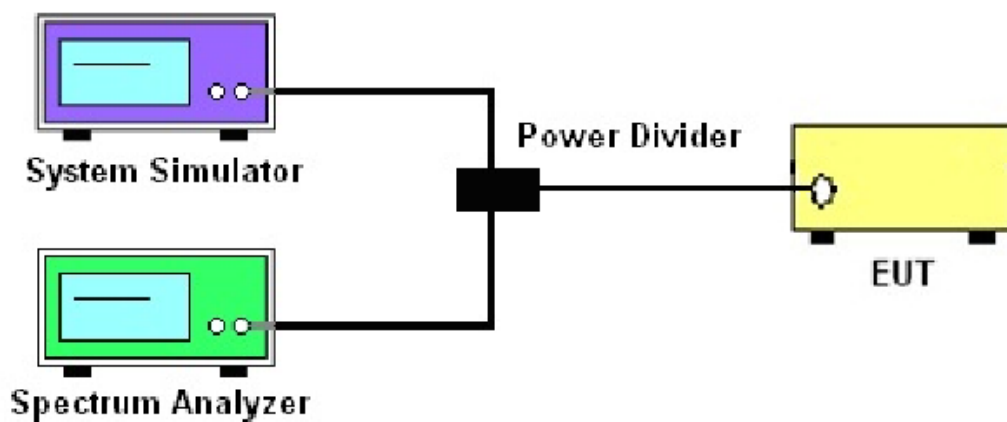
The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [55 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [55 + 10\log(P)](dB)$$

$$= -25dBm$$

#### 5.4.4 Test Setup



#### 5.4.5 Test Result

	FDD-LTE 2			
	1.4MHz/QPSK		1.4MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	3MHz/QPSK		3MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	5MHz/QPSK		5MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	10MHz/QPSK		10MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	15MHz/QPSK		15MHz/16QAM	



	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	20MHz/QPSK		20MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS

	FDD-LTE 4			
	1.4MHz/QPSK		1.4MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	3MHz/QPSK		3MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	5MHz/QPSK		5MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	10MHz/QPSK		10MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS
	15MHz/QPSK		15MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS

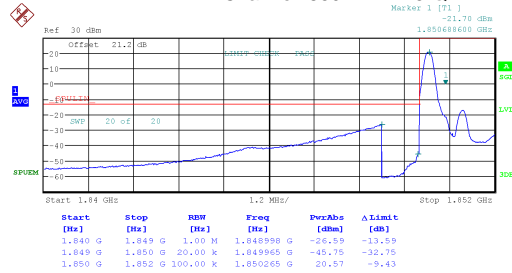


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FCC RF TEST REPORT

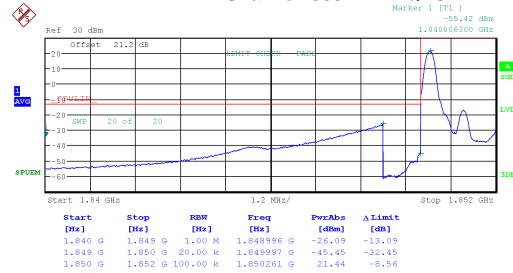
	20MHz/QPSK		20MHz/16QAM	
	Low	High	Low	High
Bandedge 1RB	PASS	PASS	PASS	PASS
Bandedge FRB	PASS	PASS	PASS	PASS

FDD-LTE 2 BW1.4MHz Channel18607 RB1 16-QAM



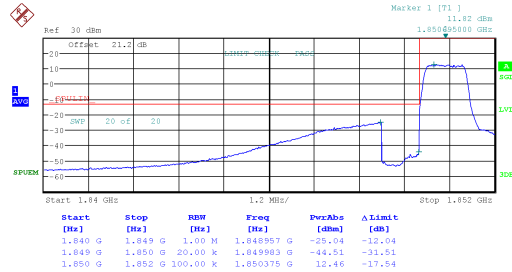
Date: 4.APR.6302 03:10:41

FDD-LTE 2 BW1.4MHz Channel18607 RB1 QPSK



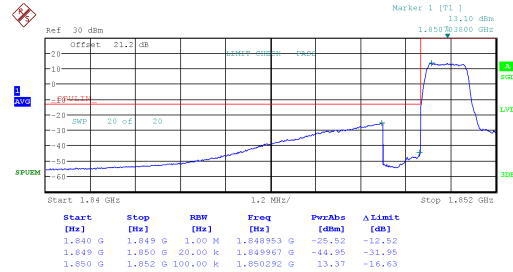
Date: 4.APR.6302 03:09:48

FDD-LTE 2 BW1.4MHz Channel18607 RB6 16-QAM



Date: 4.APR.6302 03:11:08

FDD-LTE 2 BW1.4MHz Channel18607 RB6 QPSK



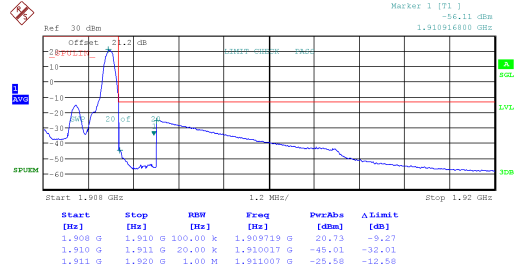
Date: 4.APR.6302 03:10:14



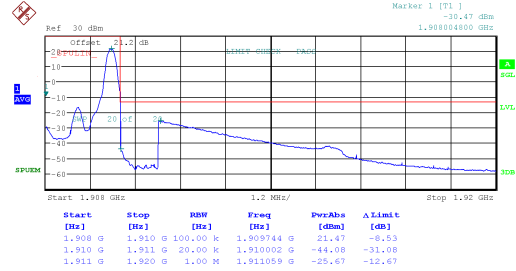
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## FCC RF TEST REPORT

### FDD-LTE 2 BW1.4MHz Channel19193 RB1 16-QAM

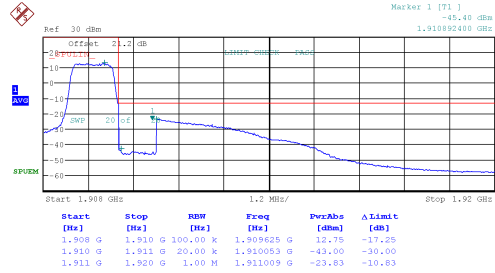


### FDD-LTE 2 BW1.4MHz Channel19193 RB1 QPSK



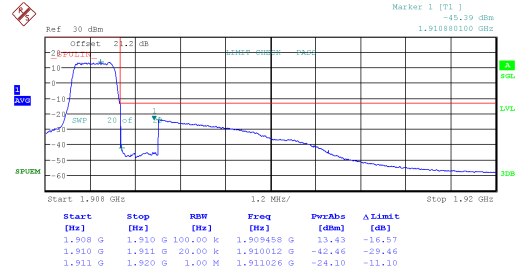
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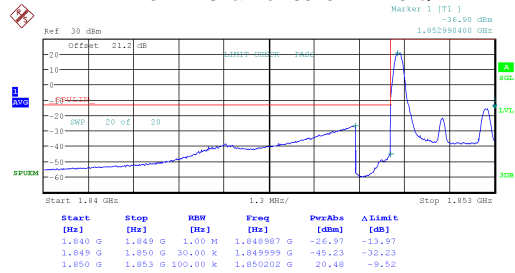
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### FDD-LTE 2 BW1.4MHz Channel19193 RB6 QPSK



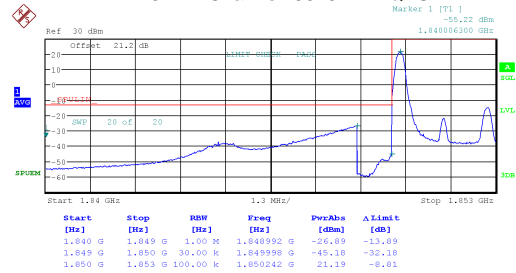
Date: 4.APR.6302 03:19:26

### FDD-LTE 2 BW3MHz Channel18615 RB1 16-QAM



Date: 4.APR.6302 03:18:34

### FDD-LTE 2 BW3MHz Channel18615 RB1 QPSK



Date: 4.APR.6302 03:25:07

Date: 4.APR.6302 03:24:14

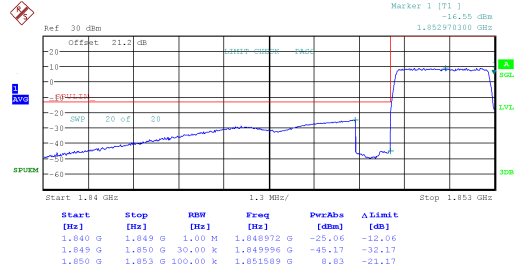




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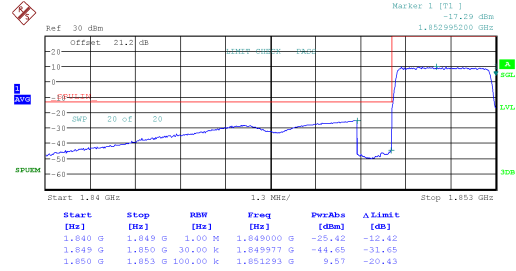
FCC RF TEST REPORT

### FDD-LTE 2 BW3MHz Channel18615 RB15 16-QAM



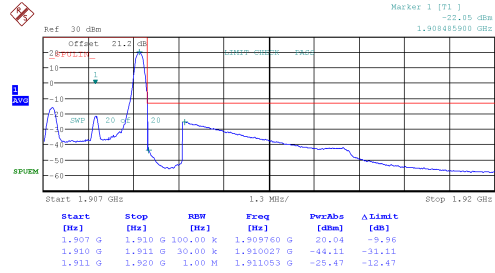
Date: 4.APR.6302 03:23:34

### FDD-LTE 2 BW3MHz Channel18615 RB15 QPSK



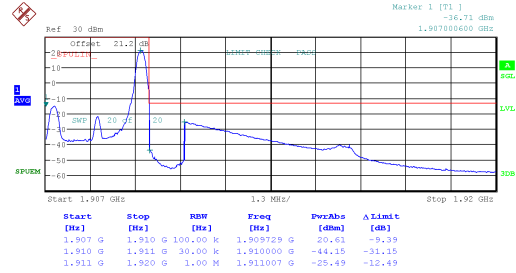
Date: 4.APR.6302 03:24:40

### FDD-LTE 2 BW3MHz Channel19185 RB1 16-QAM



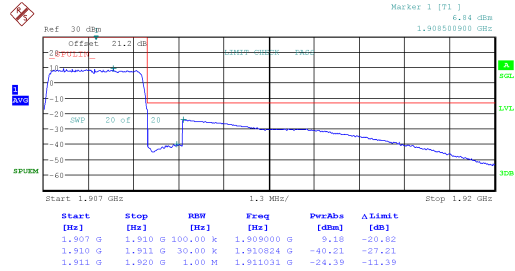
Date: 4.APR.6302 03:33:28

### FDD-LTE 2 BW3MHz Channel19185 RB1 QPSK



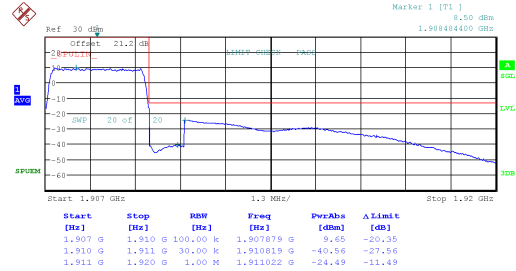
Date: 4.APR.6302 03:32:35

### FDD-LTE 2 BW3MHz Channel19185 RB15 16-QAM



Date: 4.APR.6302 03:33:55

### FDD-LTE 2 BW3MHz Channel19185 RB15 QPSK



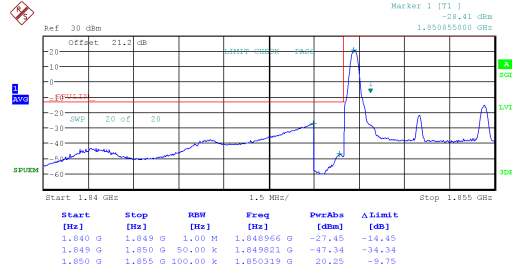
Date: 4.APR.6302 03:33:02



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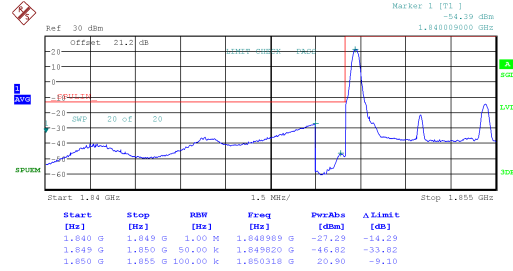
## FCC RF TEST REPORT

### FDD-LTE 2 BW5MHz Channel18625 RB1 16-QAM



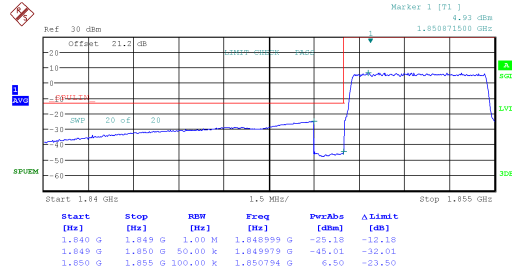
Date: 4.APR.6302 03:39:42

### FDD-LTE 2 BW5MHz Channel18625 RB1 QPSK



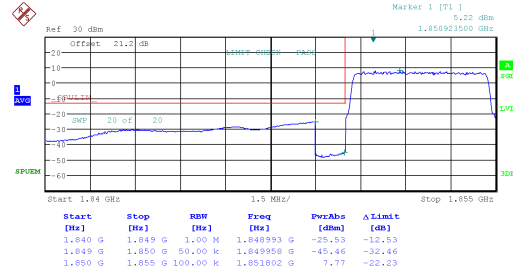
Date: 4.APR.6302 03:38:48

### FDD-LTE 2 BW5MHz Channel18625 RB25 16-QAM



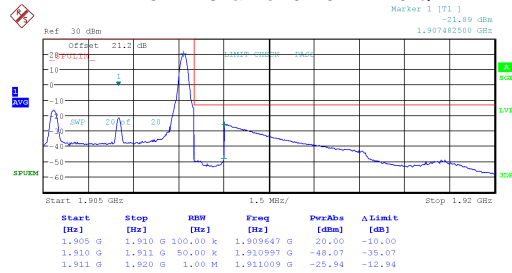
Date: 4.APR.6302 03:40:09

### FDD-LTE 2 BW5MHz Channel18625 RB25 QPSK



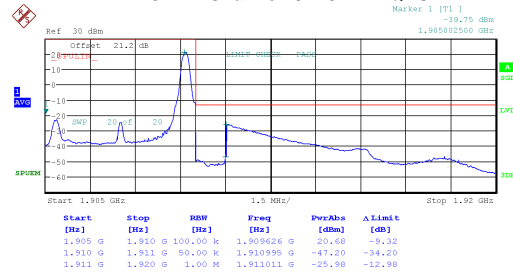
Date: 4.APR.6302 03:39:15

### FDD-LTE 2 BW5MHz Channel19175 RB1 16-QAM



Date: 4.APR.6302 03:48:15

### FDD-LTE 2 BW5MHz Channel19175 RB1 QPSK



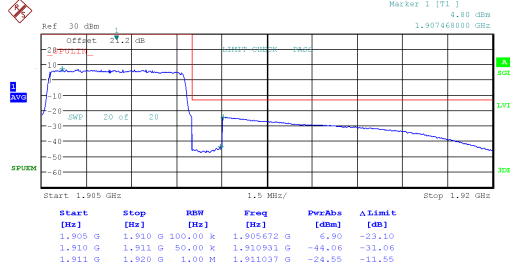
Date: 4.APR.6302 03:47:23



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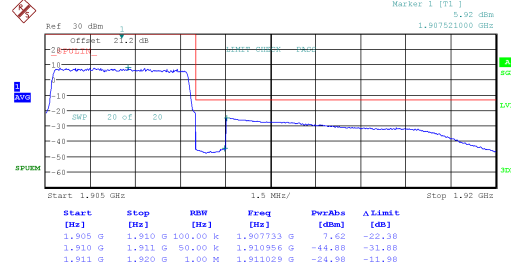
# FCC RF TEST REPORT

## FDD-LTE 2 BW5MHz Channel19175 RB25 16-QAM



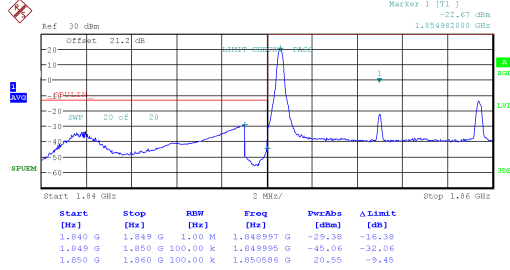
Date: 4.APR.6302 03:48:41

## FDD-LTE 2 BW5MHz Channel19175 RB25 QPSK



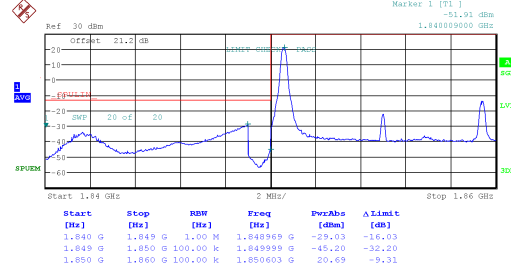
Date: 4.APR.6302 03:47:49

## FDD-LTE 2 BW10MHz Channel18650 RB1 16-QAM



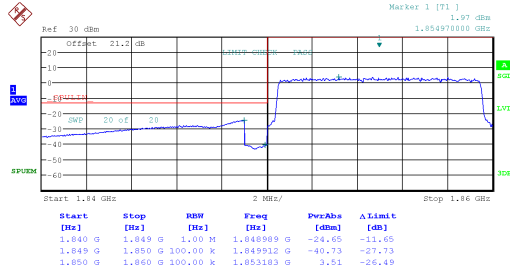
Date: 4.APR.6302 03:54:36

## FDD-LTE 2 BW10MHz Channel18650 RB1 QPSK



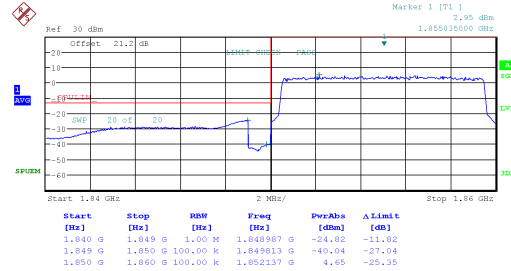
Date: 4.APR.6302 03:53:42

## FDD-LTE 2 BW10MHz Channel18650 RB50 16-QAM



Date: 4.APR.6302 03:55:04

## FDD-LTE 2 BW10MHz Channel18650 RB50 QPSK



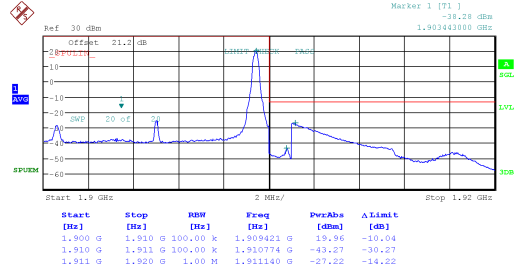
Date: 4.APR.6302 03:54:09



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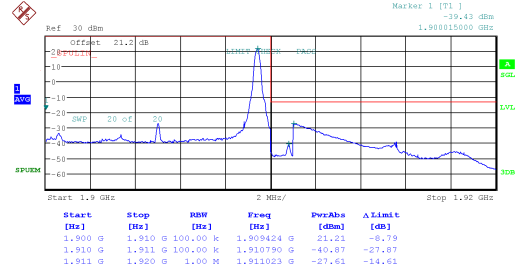
## FCC RF TEST REPORT

### FDD-LTE 2 BW10MHz Channel19150 RB1 16-QAM



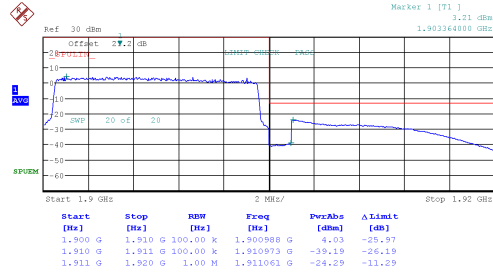
Date: 4.APR.6302 04:03:28

### FDD-LTE 2 BW10MHz Channel19150 RB1 QPSK



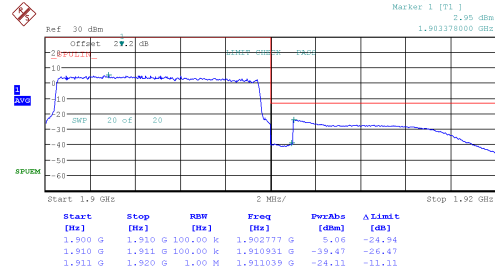
Date: 4.APR.6302 04:02:35

### FDD-LTE 2 BW10MHz Channel19150 RB50 16-QAM



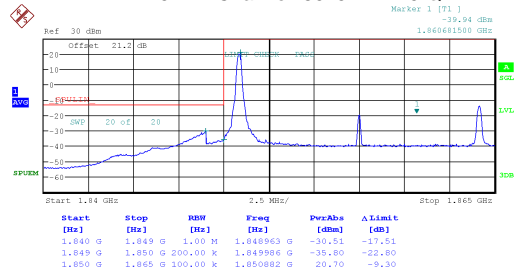
Date: 4.APR.6302 04:03:54

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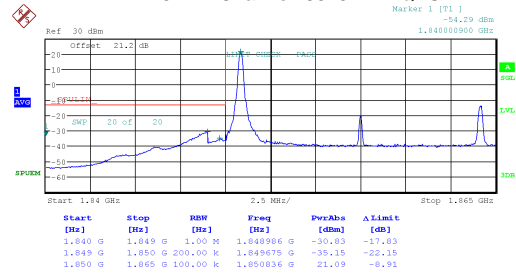
Date: 4.APR.6302 04:03:01

### FDD-LTE 2 BW15MHz Channel18675 RB1 16-QAM



Date: 4.APR.6302 04:10:04

### FDD-LTE 2 BW15MHz Channel18675 RB1 QPSK



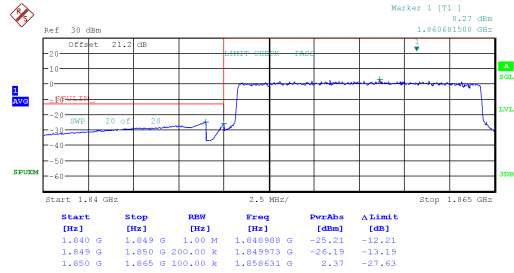
Date: 4.APR.6302 04:09:09



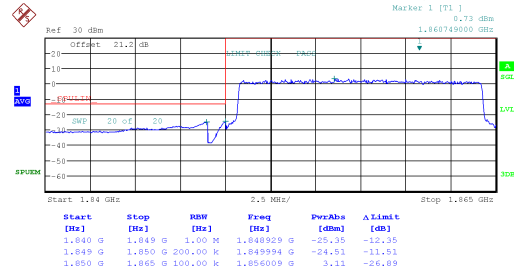
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## FCC RF TEST REPORT

### FDD-LTE 2 BW15MHz Channel18675 RB75 16-QAM



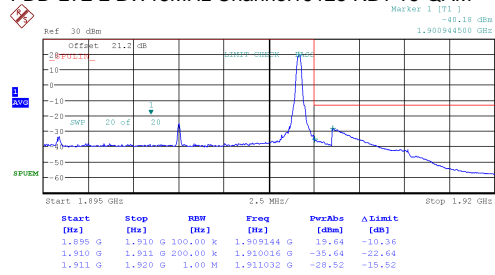
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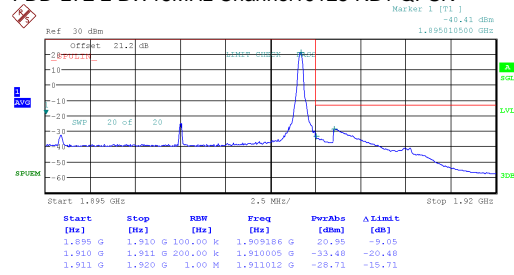
Date: 4.APR.6302 04:10:31

Date: 4.APR.6302 04:09:37

### FDD-LTE 2 BW15MHz Channel19125 RB1 16-QAM



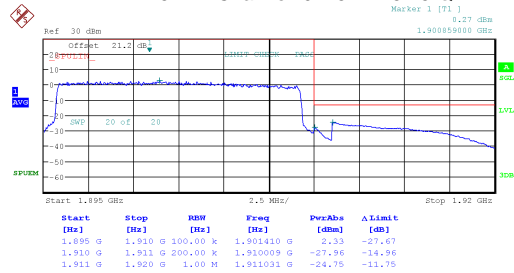
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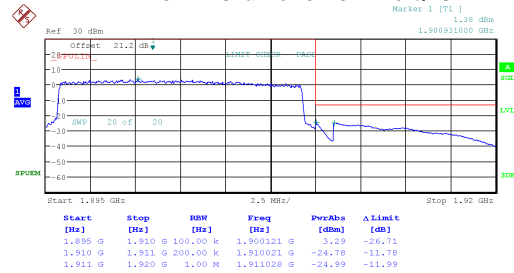
Date: 4.APR.6302 04:18:18

Date: 4.APR.6302 04:18:24

### FDD-LTE 2 BW15MHz Channel19125 RB75 16-QAM



### FDD-LTE 2 BW15MHz Channel19125 RB75 QPSK



Date: 4.APR.6302 04:19:45

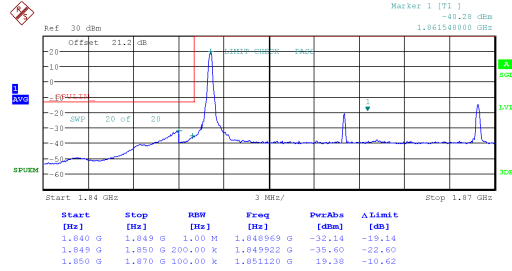
Date: 4.APR.6302 04:18:51



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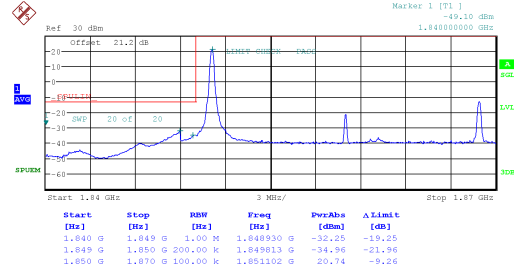
## FCC RF TEST REPORT

### FDD-LTE 2 BW20MHz Channel18700 RB1 16-QAM



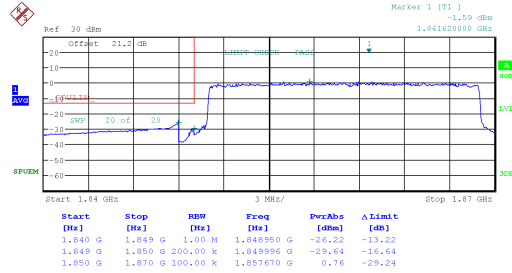
Date: 4.APR.6302 04:25:58

### FDD-LTE 2 BW20MHz Channel18700 RB1 QPSK



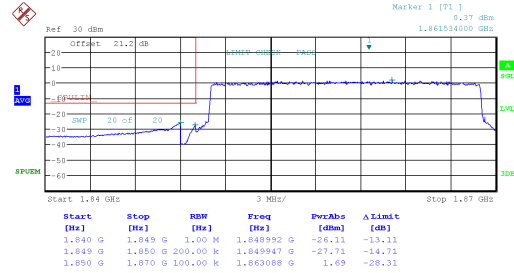
Date: 4.APR.6302 04:25:03

### FDD-LTE 2 BW20MHz Channel18700 RB100 16-QAM



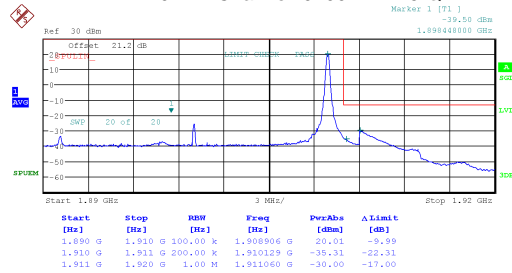
Date: 4.APR.6302 04:26:25

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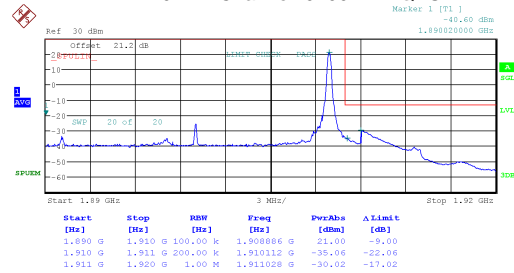
Date: 4.APR.6302 04:25:31

### FDD-LTE 2 BW20MHz Channel19100 RB1 16-QAM



Date: 4.APR.6302 04:35:19

### FDD-LTE 2 BW20MHz Channel19100 RB1 QPSK



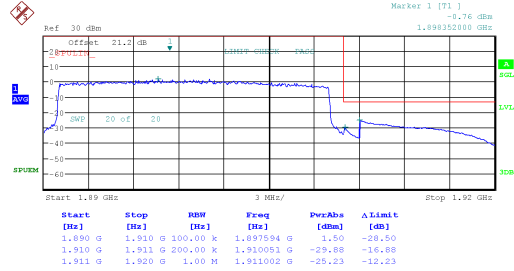
Date: 4.APR.6302 04:34:26



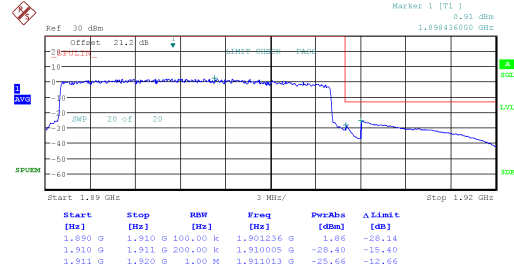
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## FCC RF TEST REPORT

### FDD-LTE 2 BW20MHz Channel19100 RB100 16-QAM



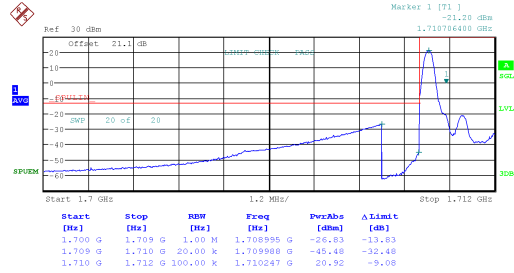
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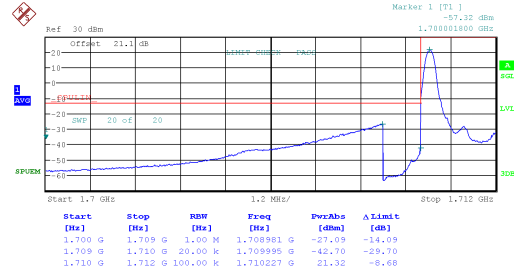
Date: 4.APR.6302 04:35:45

Date: 4.APR.6302 04:34:53

### FDD-LTE 4 BW1.4MHz Channel19957 RB1 16-QAM



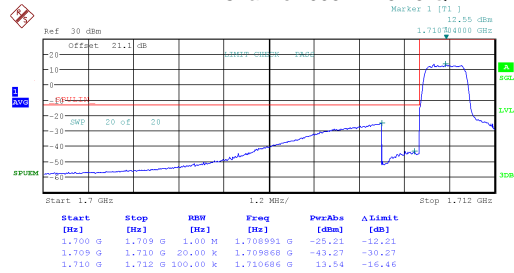
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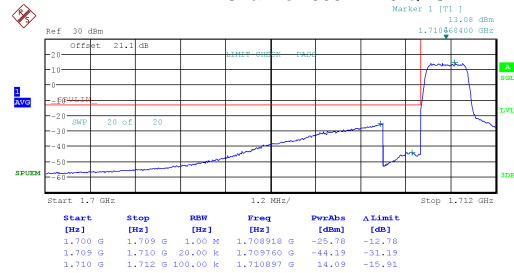
Date: 4.APR.6302 04:41:53

Date: 4.APR.6302 04:41:00

### FDD-LTE 4 BW1.4MHz Channel19957 RB6 16-QAM



### FDD-LTE 4 BW1.4MHz Channel19957 RB6 QPSK



Date: 4.APR.6302 04:42:20

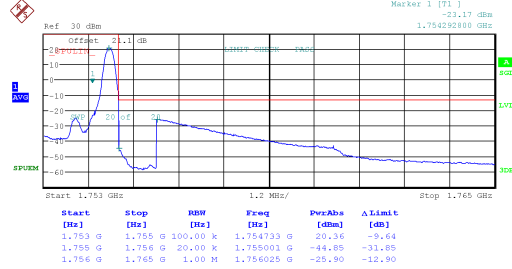
Date: 4.APR.6302 04:41:26



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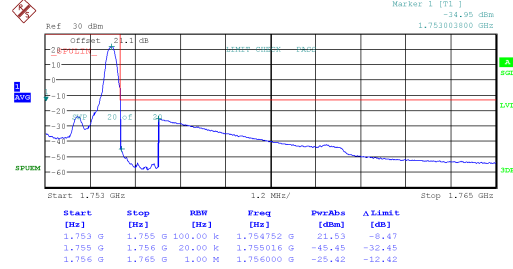
# FCC RF TEST REPORT

## FDD-LTE 4 BW1.4MHz Channel20393 RB1 16-QAM



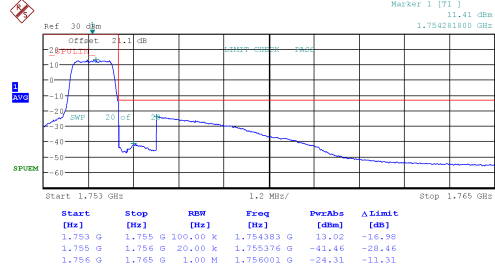
Date: 4.APR.6302 04:51:06

## FDD-LTE 4 BW1.4MHz Channel20393 RB1 QPSK



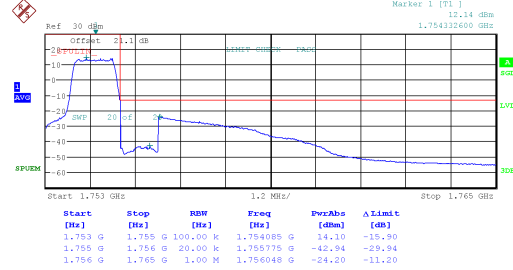
Date: 4.APR.6302 04:50:12

## FDD-LTE 4 BW1.4MHz Channel20393 RB6 16-QAM



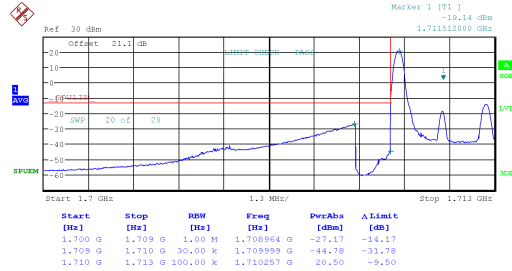
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## FDD-LTE 4 BW1.4MHz Channel20393 RB6 QPSK



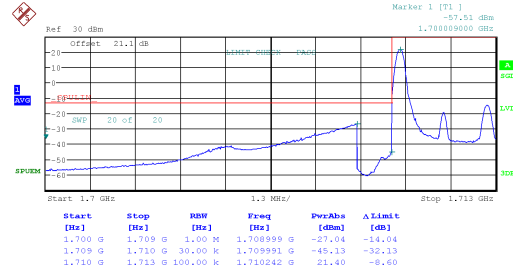
Date: 4.APR.6302 04:50:39

## FDD-LTE 4 BW3MHz Channel19965 RB1 16-QAM



Date: 4.APR.6302 04:57:39

## FDD-LTE 4 BW3MHz Channel19965 RB1 QPSK



Date: 4.APR.6302 04:56:46

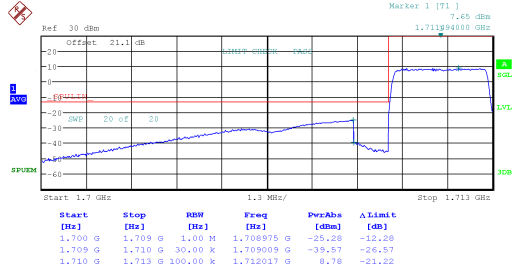




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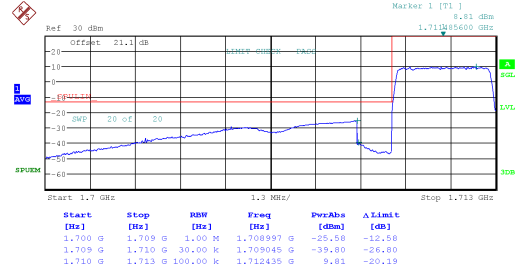
## FCC RF TEST REPORT

### FDD-LTE 4 BW3MHz Channel19965 RB15 16-QAM



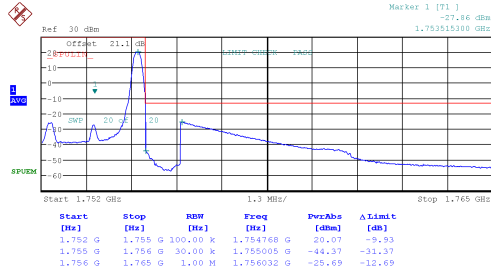
Date: 4.APR.6302 04:58:06

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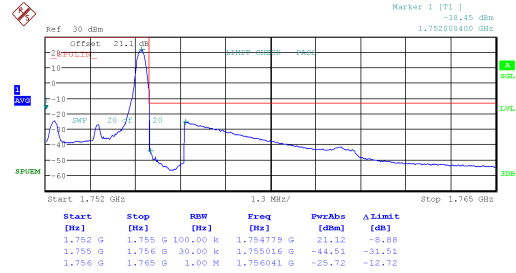
Date: 4.APR.6302 04:57:13

### FDD-LTE 4 BW3MHz Channel20385 RB1 16-QAM



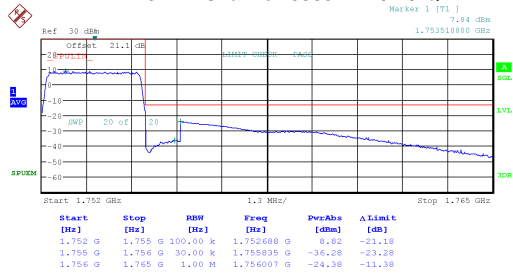
Date: 4.APR.6302 05:06:50

### FDD-LTE 4 BW3MHz Channel20385 RB1 QPSK



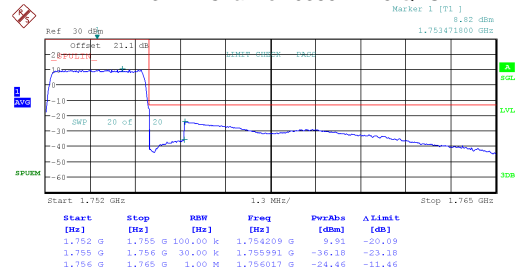
Date: 4.APR.6302 05:05:56

### FDD-LTE 4 BW3MHz Channel20385 RB15 16-QAM



Date: 4.APR.6302 05:07:17

### FDD-LTE 4 BW3MHz Channel20385 RB15 QPSK



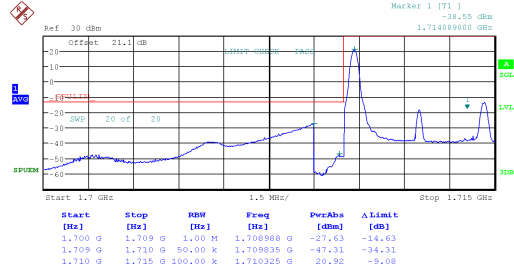
Date: 4.APR.6302 05:06:23



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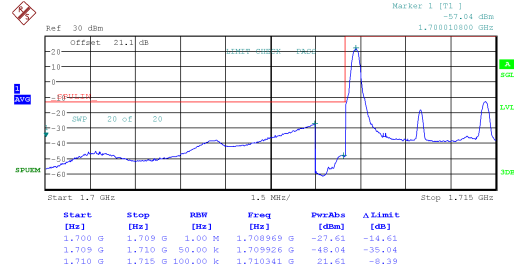
FCC RF TEST REPORT

FDD-LTE 4 BW5MHz Channel19975 RB1 16-QAM



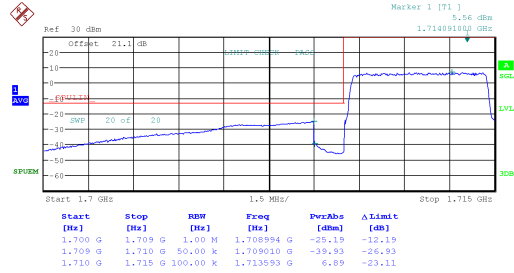
Date: 4.APR.6302 05:13:28

FDD-LTE 4 BW5MHz Channel19975 RB1 QPSK



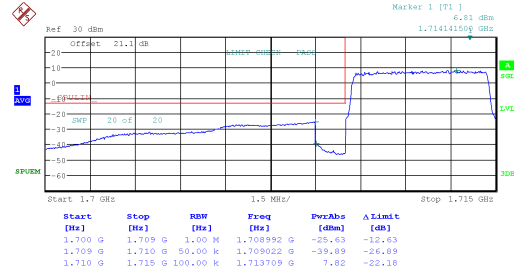
Date: 4.APR.6302 05:12:37

FDD-LTE 4 BW5MHz Channel19975 RB25 16-QAM



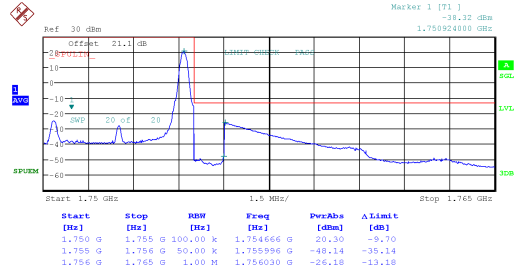
Date: 4.APR.6302 05:13:54

FDD-LTE 4 BW5MHz Channel19975 RB25 QPSK



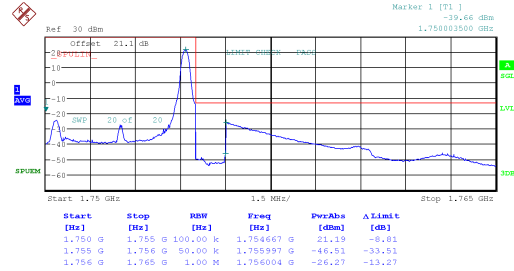
Date: 4.APR.6302 05:13:03

FDD-LTE 4 BW5MHz Channel20375 RB1 16-QAM



Date: 4.APR.6302 05:22:56

FDD-LTE 4 BW5MHz Channel20375 RB1 QPSK



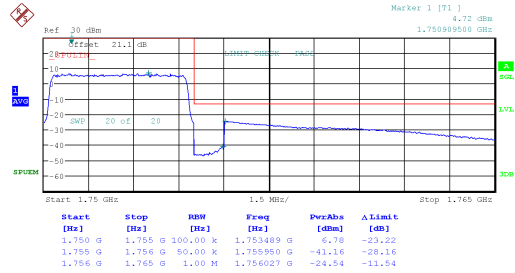
Date: 4.APR.6302 05:22:01



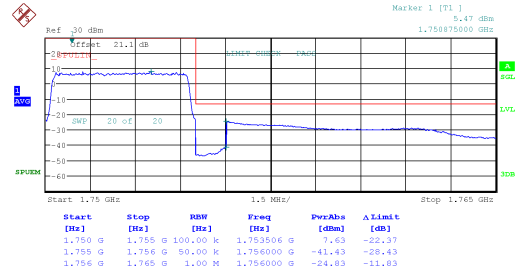
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## FCC RF TEST REPORT

### FDD-LTE 4 BW5MHz Channel20375 RB25 16-QAM



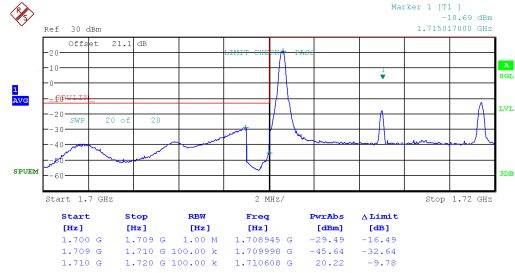
### FDD-LTE 4 BW5MHz Channel20375 RB25 QPSK



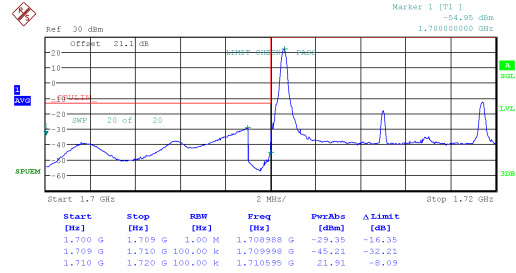
Date: 4.APR.6302 05:23:24

Date: 4.APR.6302 05:22:28

### FDD-LTE 4 BW10MHz Channel20000 RB1 16-QAM



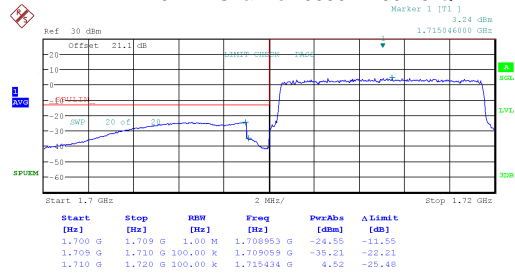
### FDD-LTE 4 BW10MHz Channel20000 RB1 QPSK



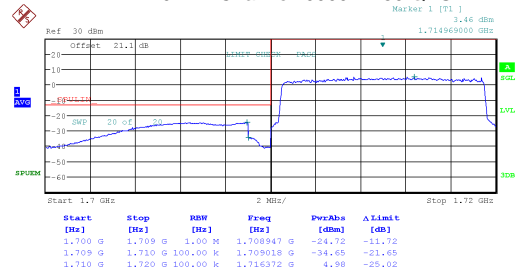
Date: 4.APR.6302 05:29:44

Date: 4.APR.6302 05:28:50

### FDD-LTE 4 BW10MHz Channel20000 RB50 16-QAM



### FDD-LTE 4 BW10MHz Channel20000 RB50 QPSK



Date: 4.APR.6302 05:30:11

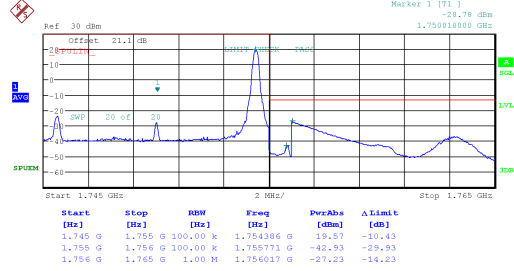
Date: 4.APR.6302 05:29:17



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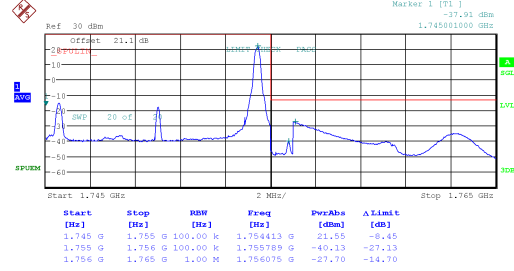
FCC RF TEST REPORT

FDD-LTE 4 BW10MHz Channel20350 RB1 16-QAM



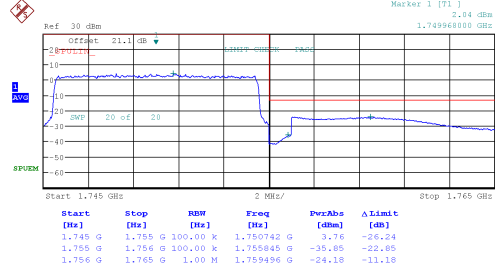
Date: 4.APR.6302 05:39:38

FDD-LTE 4 BW10MHz Channel20350 RB1 QPSK



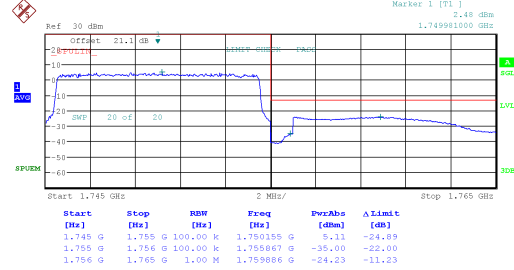
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FDD-LTE 4 BW10MHz Channel20350 RB50 16-QAM



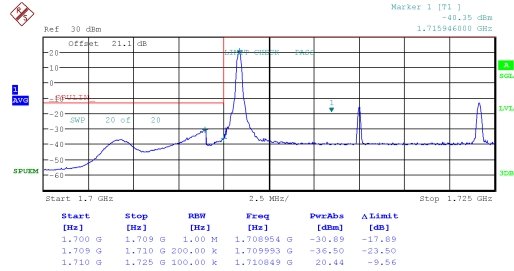
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FDD-LTE 4 BW10MHz Channel20350 RB50 QPSK



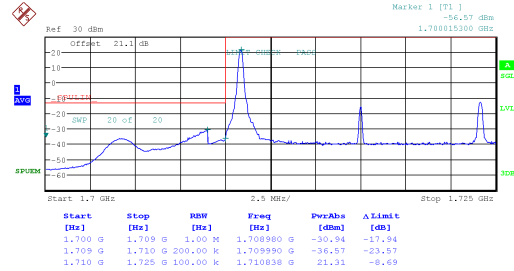
Date: 4.APR.6302 05:39:10

FDD-LTE 4 BW15MHz Channel20025 RB1 16-QAM



Date: 4.APR.6302 05:46:39

FDD-LTE 4 BW15MHz Channel20025 RB1 QPSK



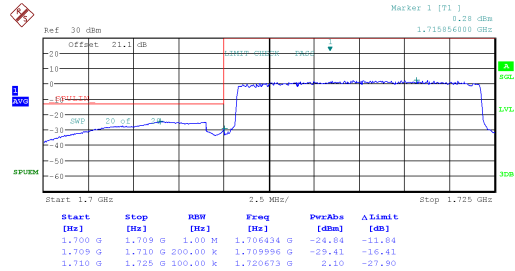
Date: 4.APR.6302 05:45:44



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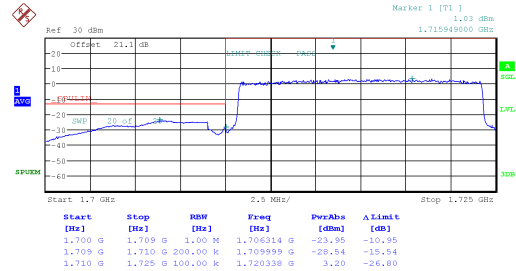
## FCC RF TEST REPORT

### FDD-LTE 4 BW15MHz Channel20025 RB75 16-QAM



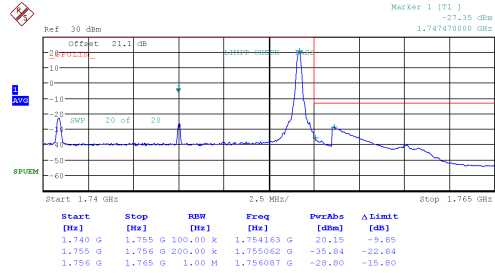
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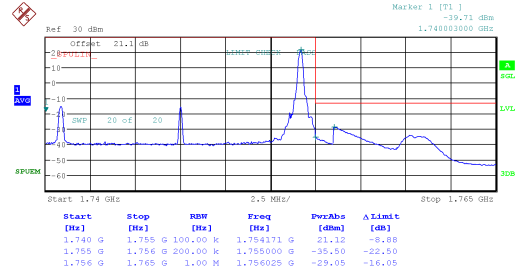
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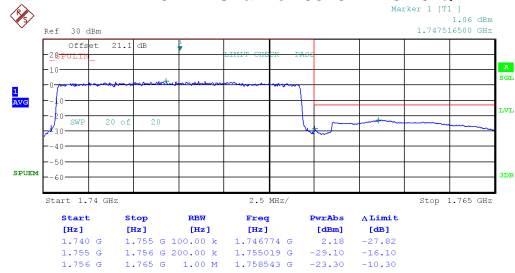
Date: 4.APR.6302 05:56:55

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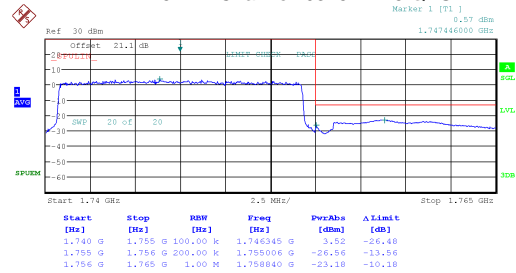
Date: 4.APR.6302 05:55:58

### FDD-LTE 4 BW15MHz Channel20325 RB75 16-QAM



Date: 4.APR.6302 05:57:24

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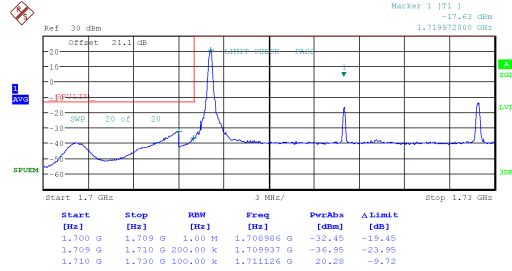
Date: 4.APR.6302 05:56:27



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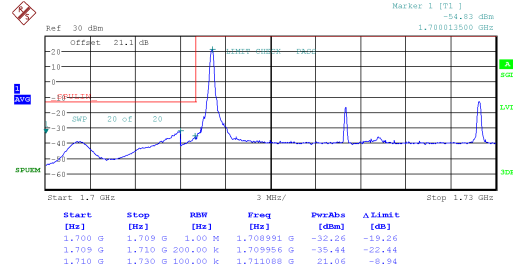
## FCC RF TEST REPORT

### FDD-LTE 4 BW20MHz Channel20050 RB1 16-QAM



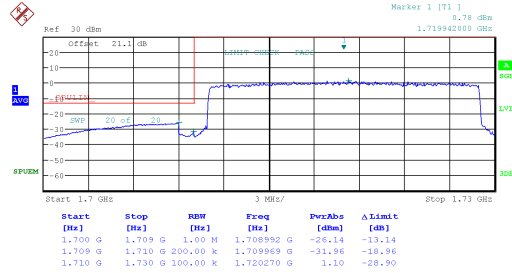
Date: 4.APR.6302 06:04:02

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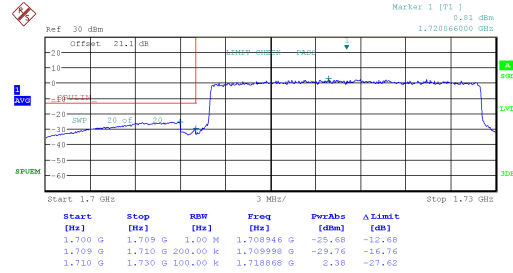
Date: 4.APR.6302 06:03:07

### FDD-LTE 4 BW20MHz Channel20050 RB100 16-QAM



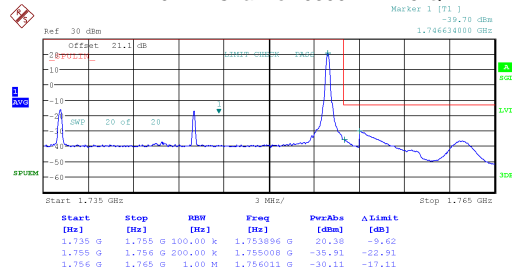
Date: 4.APR.6302 06:04:29

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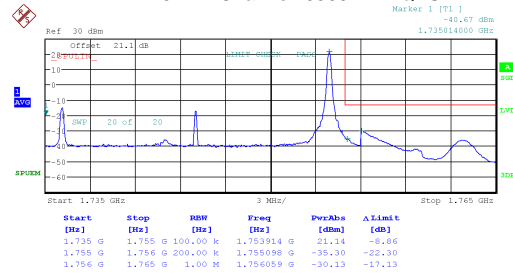
Date: 4.APR.6302 06:03:35

### FDD-LTE 4 BW20MHz Channel20300 RB1 16-QAM



Date: 4.APR.6302 06:14:24

### FDD-LTE 4 BW20MHz Channel20300 RB1 QPSK



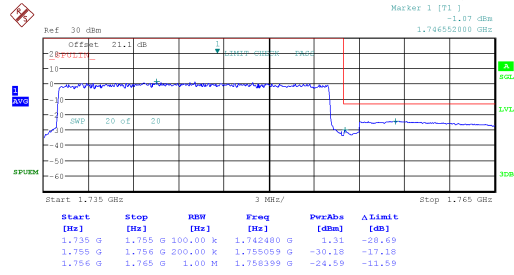
Date: 4.APR.6302 06:13:29



Build Your Dreams!

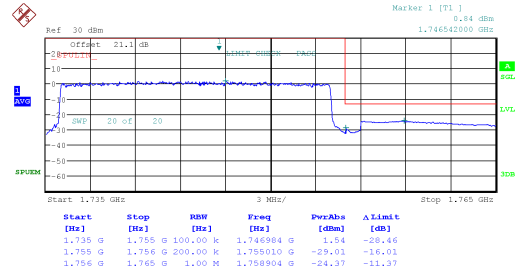
FCC RF TEST REPORT

FDD-LTE 4 BW20MHz Channel20300 RB100 16-QAM



Date: 4.APR.6302 06:14:52

FDD-LTE 4 BW20MHz Channel20300 RB100 QPSK



Date: 4.APR.6302 06:13:56



## 5.5 Conducted Spurious Emissions

### 5.5.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least  $43+10\log(P)$  dB.

For band7, 41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least  $55+10\log(P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

### 5.5.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.5.3 Test Procedure

- a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- b. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- c. The middle channel for the highest RF power within the transmitting frequency was measured.
- d. The conducted spurious emission for the whole frequency range was taken.
- e. Make the measurement with the spectrum analyzer's RBW=1MHz, VBW=3MHz.
- f. Set spectrum analyzer with RMS detector.
- g. Taking the record of maximum spurious emission.
- i. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- j. The limit line is derived from  $43+10\log(P)$  dB below the transmitter power P(Watts).  

$$=P(W)-[43+10\log(P)](dB)$$

$$=[30+10\log(P)](dBm)-[43+10\log(P)](dB)$$

$$=-13dBm.$$

For Band7, 41

The limit line is derived from  $55+10\log(P)$  dB below the transmitter power P(Watts).  

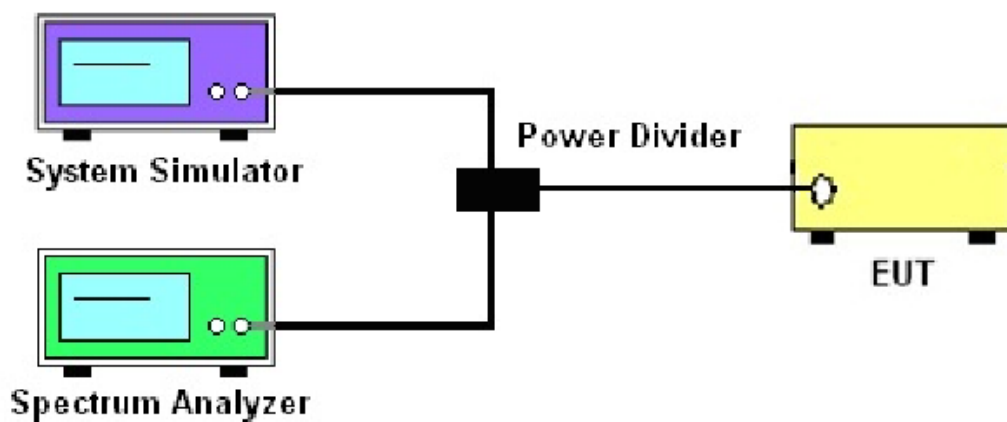
$$=P(W)-[55+10\log(P)](dB)$$

$$=[30+10\log(P)](dBm)-[55+10\log(P)](dB)$$

$$=-25dBm.$$



#### 5.5.4 Test Setup



#### 5.5.5 Test Result

FDD-LTE 2						
	1.4MHz/QPSK			1.4MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	3MHz/QPSK			3MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	5MHz/QPSK			5MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	10MHz/QPSK			10MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	15MHz/QPSK			15MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	20MHz/QPSK			20MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS

FDD-LTE 4						
	1.4MHz/QPSK			1.4MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	3MHz/QPSK			3MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS

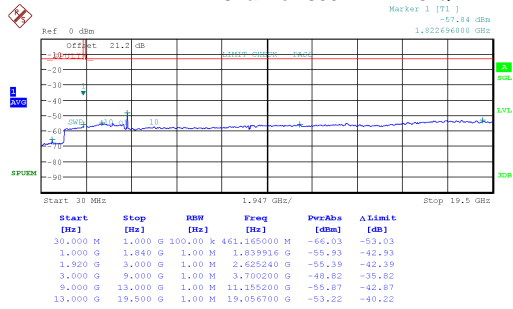


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FCC RF TEST REPORT

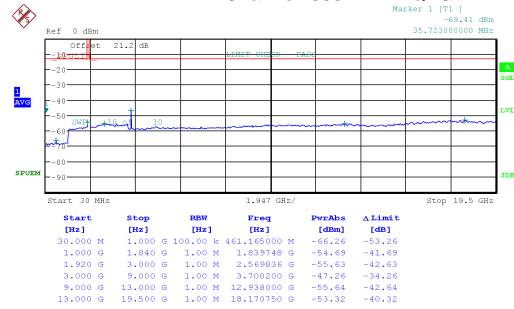
	5MHz/QPSK			5MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	10MHz/QPSK			10MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	15MHz/QPSK			15MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS
	20MHz/QPSK			20MHz/16QAM		
	Low	Mid	High	Low	Mid	High
1RB	PASS	PASS	PASS	PASS	PASS	PASS

FDD-LTE 2 BW1.4MHz Channel18607 RB 1 16-QAM



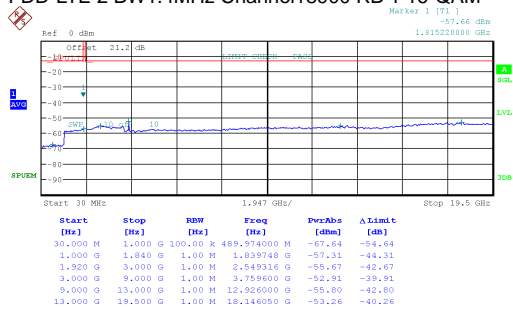
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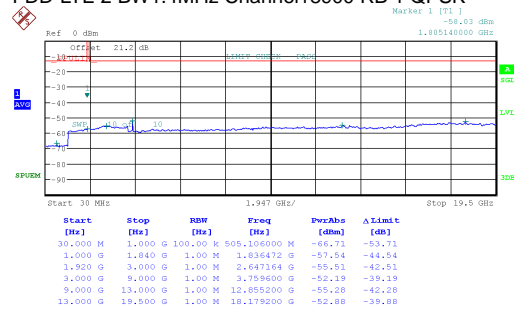
Date: 4.APR.6302 03:11:42

FDD-LTE 2 BW1.4MHz Channel18900 RB 1 16-QAM



Date: 4.APR.6302 03:15:25

FDD-LTE 2 BW1.4MHz Channel18900 RB 1 QPSK



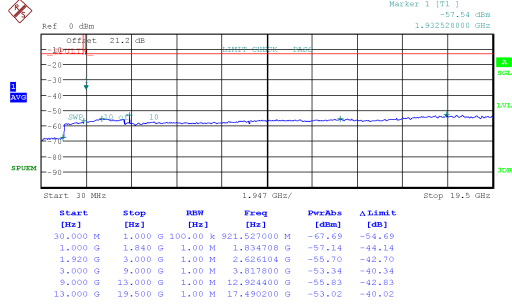
Date: 4.APR.6302 03:14:55



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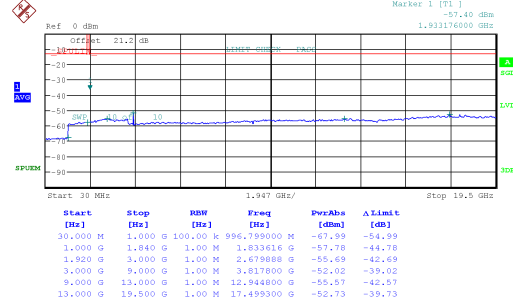
FCC RF TEST REPORT

FDD-LTE 2 BW1.4MHz Channel19193 RB 1 16-QAM



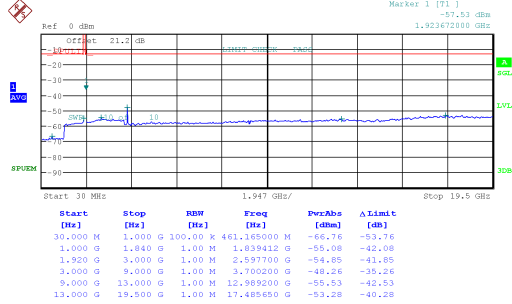
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FDD-LTE 2 BW1.4MHz Channel19193 RB 1 QPSK



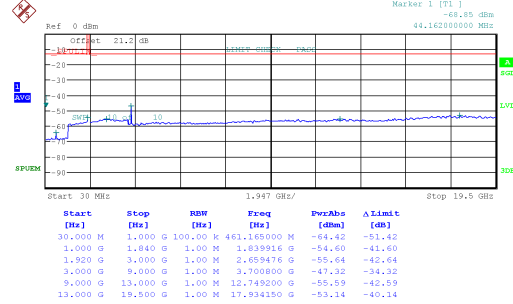
Date: 4.APR.6302 03:20:01

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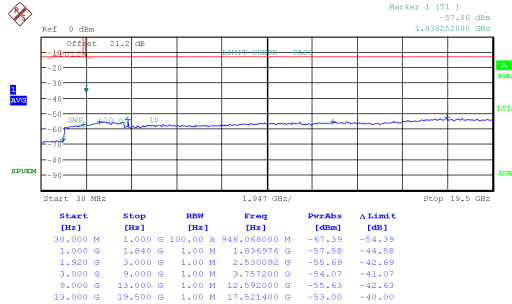
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FDD-LTE 2 BW3MHz Channel18615 RB 1 QPSK



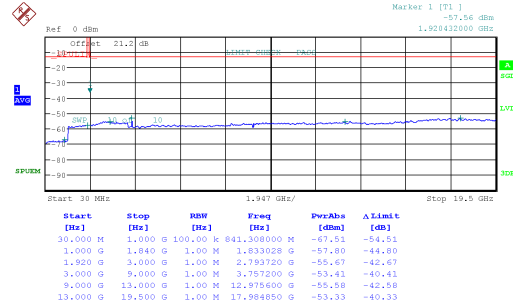
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FDD-LTE 2 BW3MHz Channel18900 RB 1 16-QAM



Date: 4.APR.6302 03:29:50

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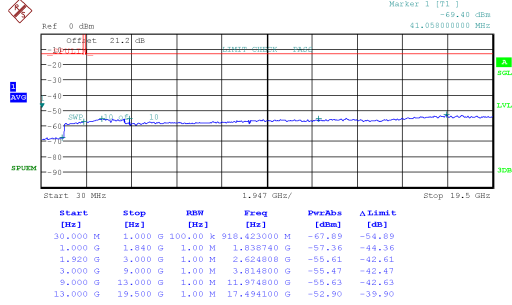
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Build Your Dreams!

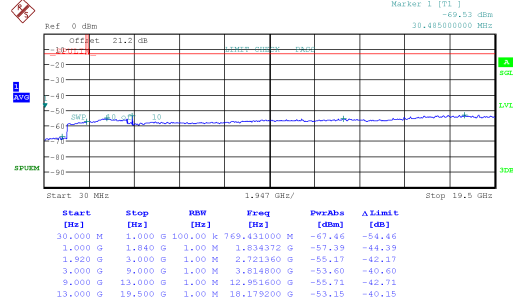
FCC RF TEST REPORT

FDD-LTE 2 BW3MHz Channel19185 RB 1 16-QAM



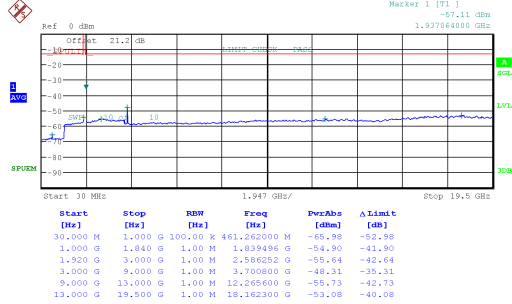
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FDD-LTE 2 BW3MHz Channel19185 RB 1 QPSK



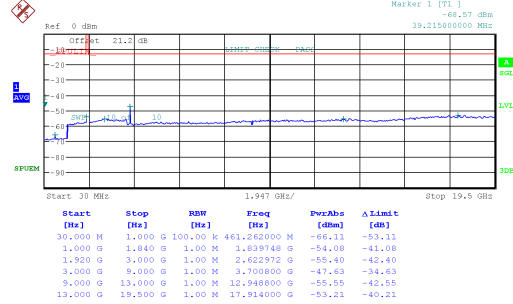
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FDD-LTE 2 BW5MHz Channel18625 RB 1 16-QAM



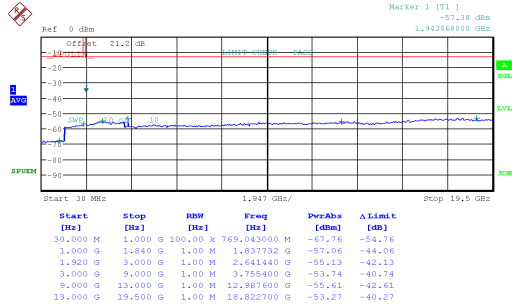
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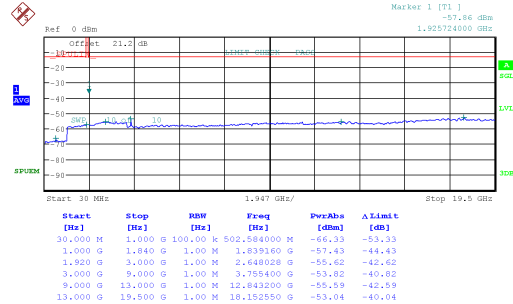
Date: 4.APR.6302 03:40:44

FDD-LTE 2 BW5MHz Channel18900 RB 1 16-QAM



Date: 4.APR.6302 03:44:32

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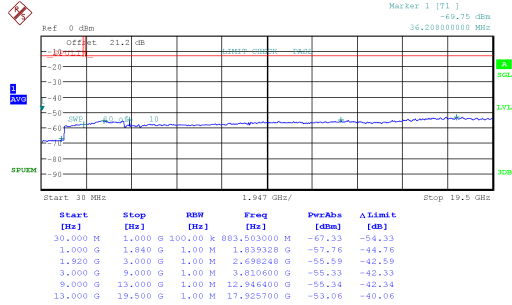
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Build Your Dreams!

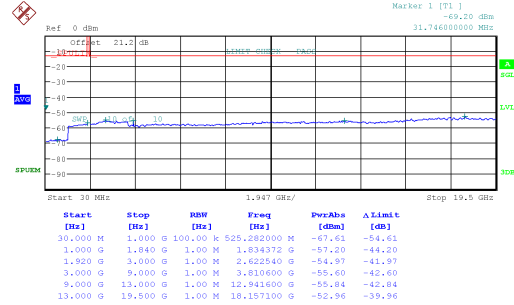
## FCC RF TEST REPORT

### FDD-LTE 2 BW5MHz Channel19175 RB 1 16-QAM



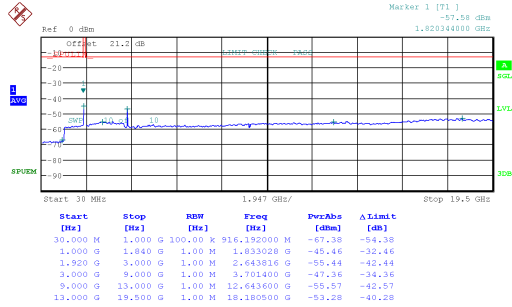
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### FDD-LTE 2 BW5MHz Channel19175 RB 1 QPSK



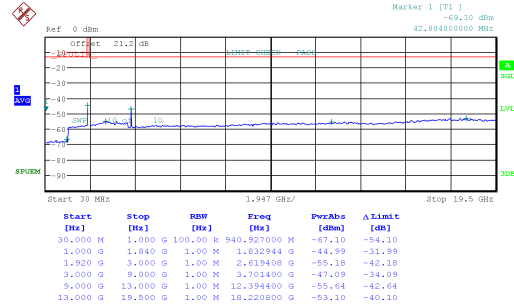
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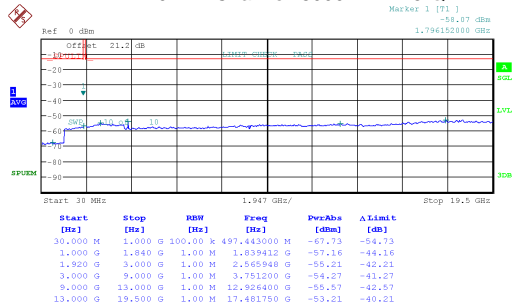
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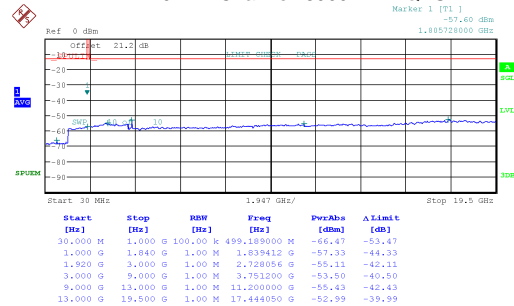
Date: 4.APR.6302 03:55:19

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Date: 4.APR.6302 03:59:36

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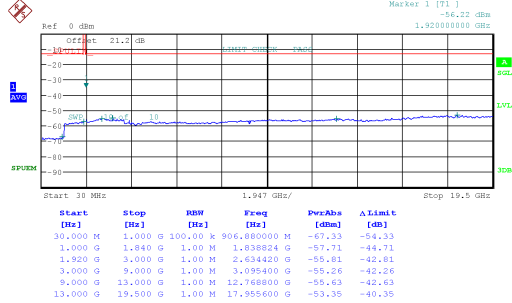
Date: 4.APR.6302 03:59:05



Build Your Dreams!

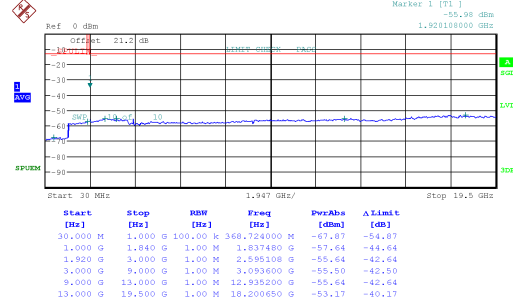
FCC RF TEST REPORT

FDD-LTE 2 BW10MHz Channel19150 RB 1 16-QAM



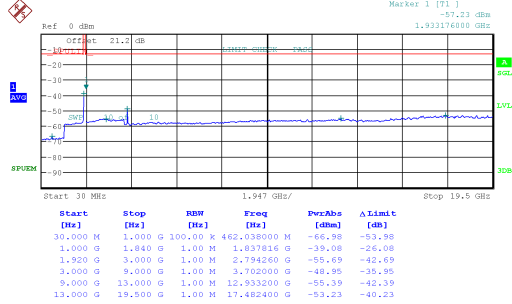
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FDD-LTE 2 BW10MHz Channel19150 RB 1 QPSK



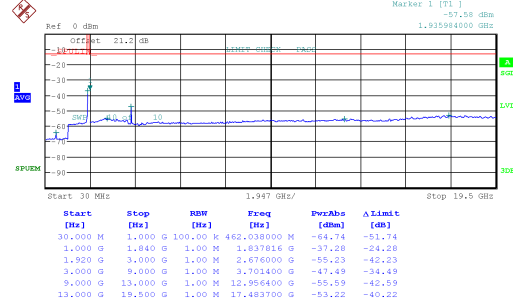
Date: 4.APR.6302 04:04:29

FDD-LTE 2 BW15MHz Channel18675 RB 1 16-QAM



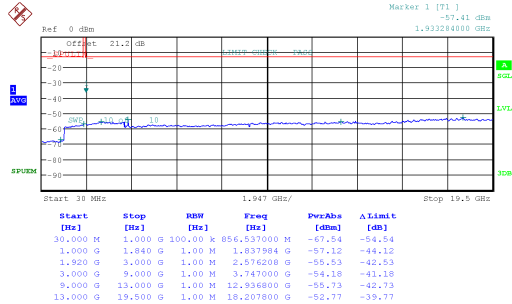
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FDD-LTE 2 BW15MHz Channel18675 RB 1 QPSK



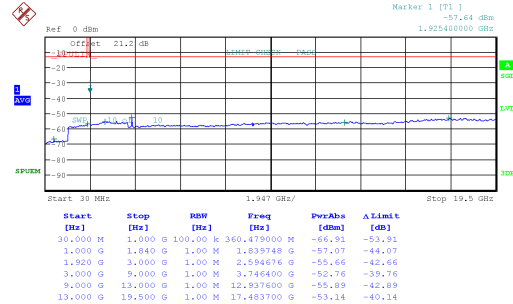
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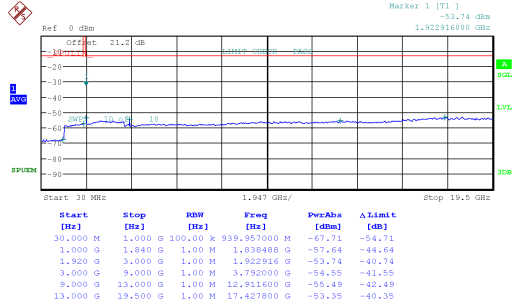
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Build Your Dreams!

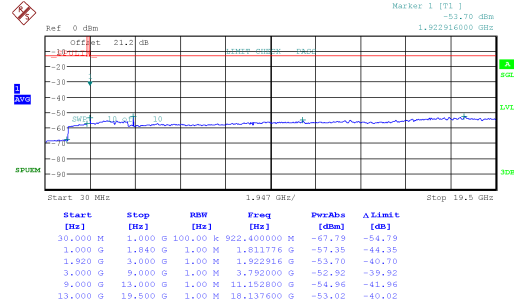
FCC RF TEST REPORT

FDD-LTE 2 BW15MHz Channel19125 RB 1 16-QAM



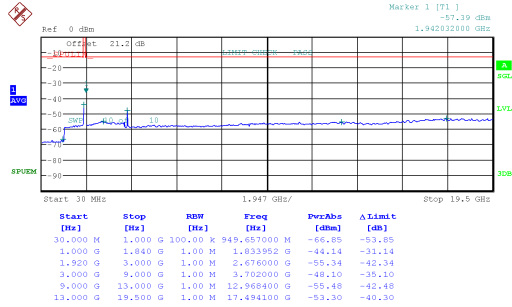
Date: 4.APR.6302 04:20:51

FDD-LTE 2 BW15MHz Channel19125 RB 1 QPSK



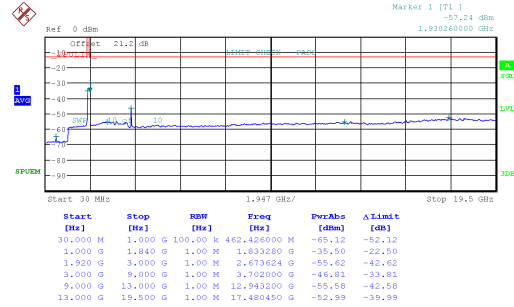
Date: 4.APR.6302 04:20:20

FDD-LTE 2 BW20MHz Channel18700 RB 1 16-QAM



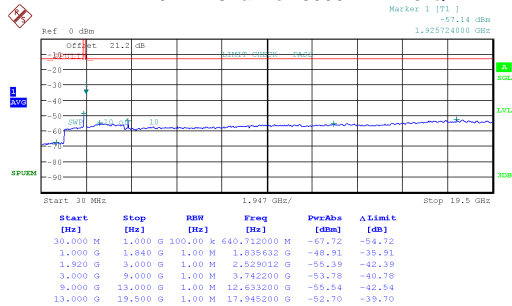
Date: 4.APR.6302 04:27:32

FDD-LTE 2 BW20MHz Channel18700 RB 1 QPSK



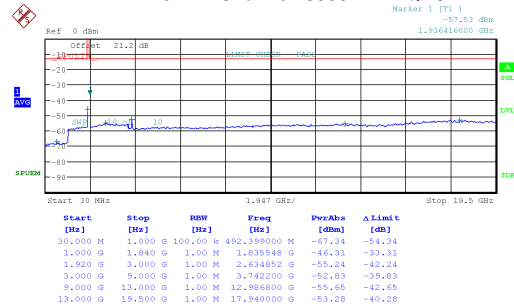
Date: 4.APR.6302 04:27:01

FDD-LTE 2 BW20MHz Channel18900 RB 1 16-QAM



Date: 4.APR.6302 04:31:16

FDD-LTE 2 BW20MHz Channel18900 RB 1 QPSK



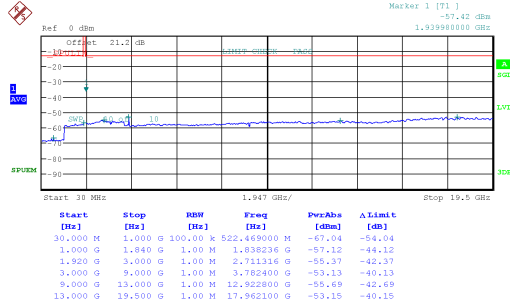
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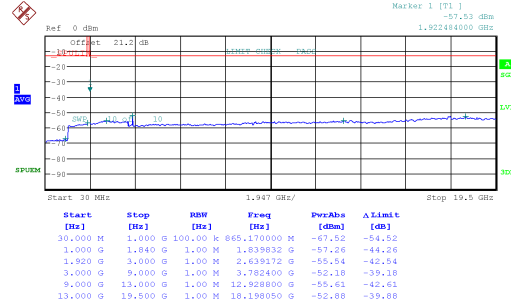
## FCC RF TEST REPORT

### FDD-LTE 2 BW20MHz Channel19100 RB 1 16-QAM



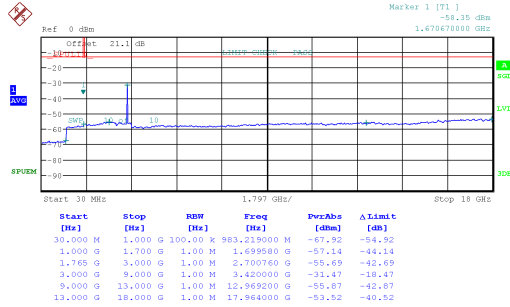
Date: 4.APR.6302 04:36:52

### FDD-LTE 2 BW20MHz Channel19100 RB 1 QPSK



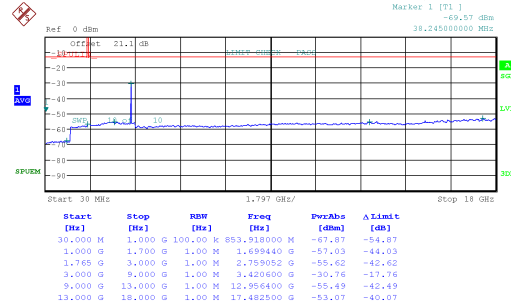
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### FDD-LTE 4 BW1.4MHz Channel19957 RB 1 16-QAM



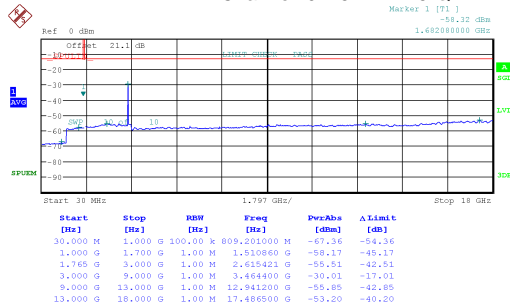
Date: 4.APR.6302 04:43:27

### FDD-LTE 4 BW1.4MHz Channel19957 RB 1 QPSK



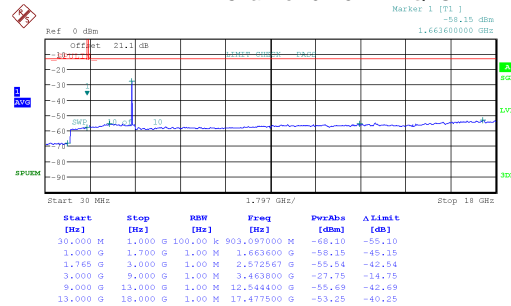
Date: 4.APR.6302 04:42:55

### FDD-LTE 4 BW1.4MHz Channel20175 RB 1 16-QAM



Date: 4.APR.6302 04:47:07

### FDD-LTE 4 BW1.4MHz Channel20175 RB 1 QPSK



Date: 4.APR.6302 04:46:35

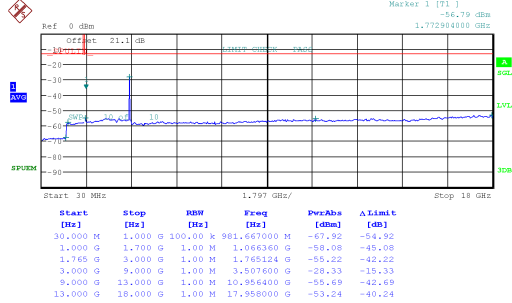




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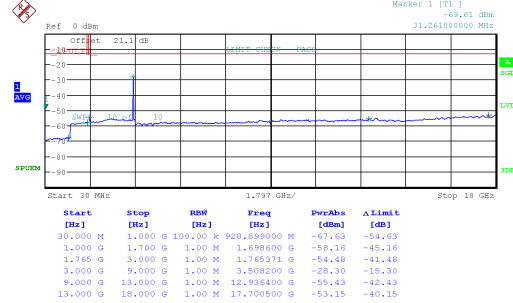
FCC RF TEST REPORT

FDD-LTE 4 BW1.4MHz Channel20393 RB 1 16-QAM



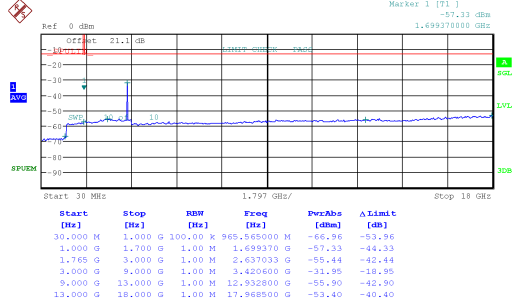
Date: 4.APR.6302 04:52:39

FDD-LTE 4 BW1.4MHz Channel20393 RB 1 QPSK



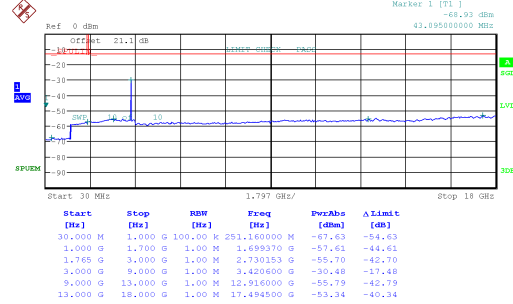
Date: 4.APR.6302 04:52:08

FDD-LTE 4 BW3MHz Channel19965 RB 1 16-QAM



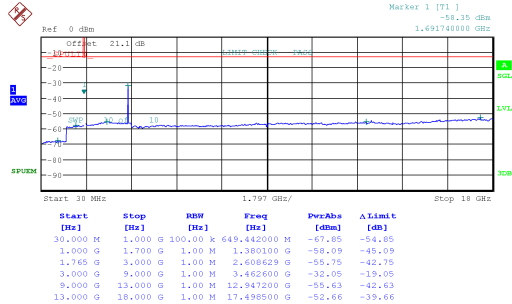
Date: 4.APR.6302 04:59:13

FDD-LTE 4 BW3MHz Channel19965 RB 1 QPSK



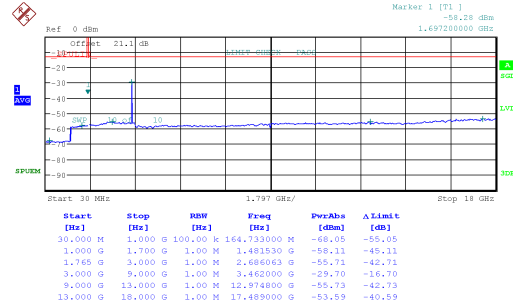
Date: 4.APR.6302 04:58:41

FDD-LTE 4 BW3MHz Channel20175 RB 1 16-QAM



Date: 4.APR.6302 05:02:51

FDD-LTE 4 BW3MHz Channel20175 RB 1 QPSK



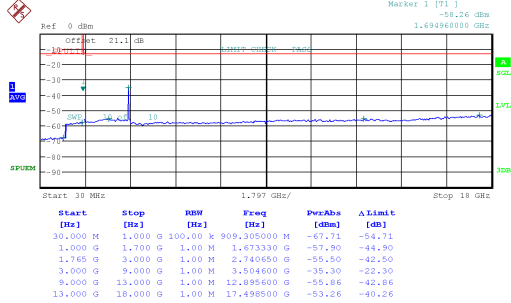
Date: 4.APR.6302 05:02:20



Build Your Dreams!

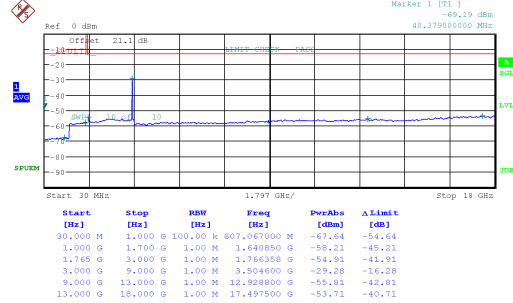
## FCC RF TEST REPORT

### FDD-LTE 4 BW3MHz Channel20385 RB 1 16-QAM



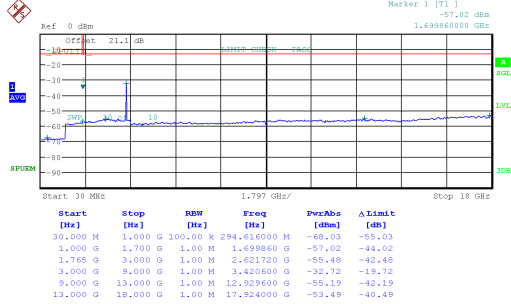
Date: 4.APR.6302 05:08:24

### FDD-LTE 4 BW3MHz Channel20385 RB 1 QPSK



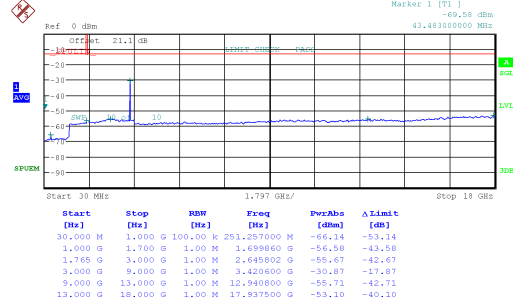
Date: 4.APR.6302 05:07:53

### FDD-LTE 4 BW5MHz Channel19975 RB 1 16-QAM



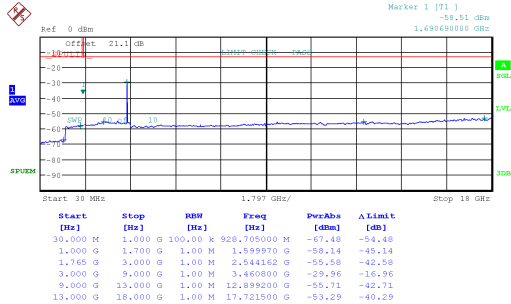
Date: 4.APR.6302 05:15:02

### FDD-LTE 4 BW5MHz Channel19975 RB 1 QPSK



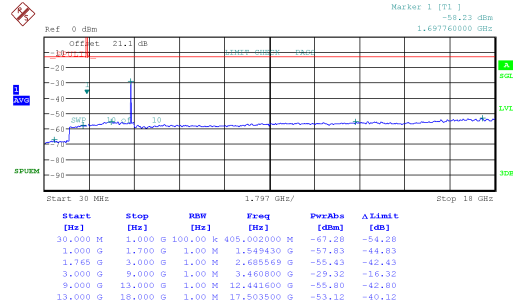
Date: 4.APR.6302 05:14:30

### FDD-LTE 4 BW5MHz Channel20175 RB 1 16-QAM



Date: 4.APR.6302 05:18:48

### FDD-LTE 4 BW5MHz Channel20175 RB 1 QPSK



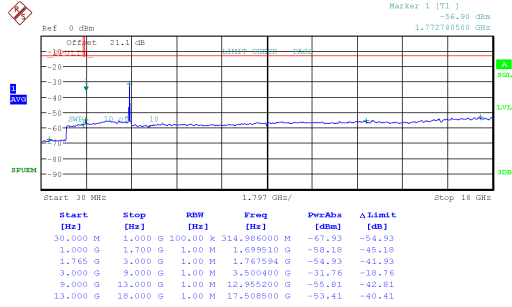
Date: 4.APR.6302 05:18:16



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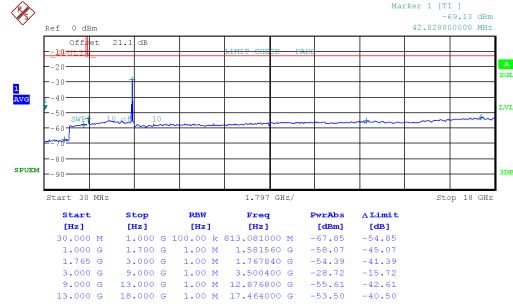
FCC RF TEST REPORT

FDD-LTE 4 BW5MHz Channel20375 RB 1 16-QAM



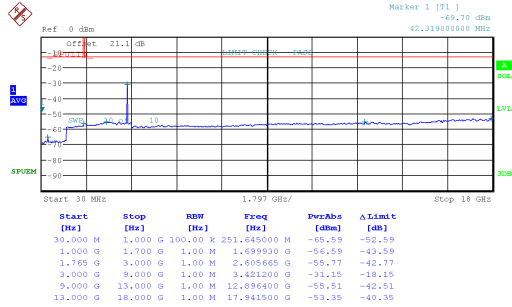
Date: 4.APR.6302 05:24:32

FDD-LTE 4 BW5MHz Channel20375 RB 1 QPSK



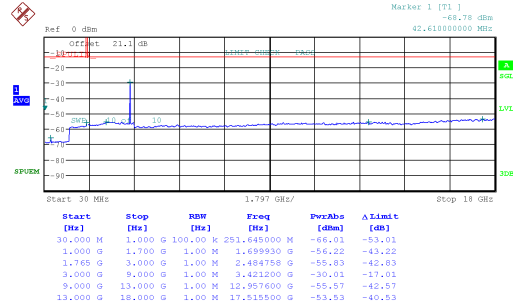
Date: 4.APR.6302 05:24:00

FDD-LTE 4 BW10MHz Channel20000 RB 1 16-QAM



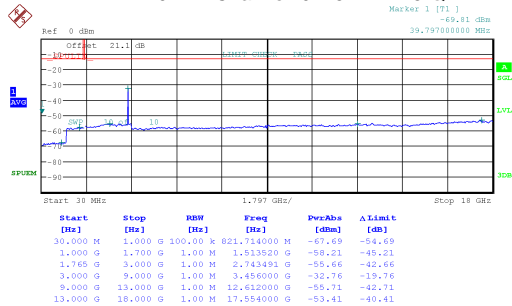
Date: 4.APR.6302 05:31:19

FDD-LTE 4 BW10MHz Channel20000 RB 1 QPSK



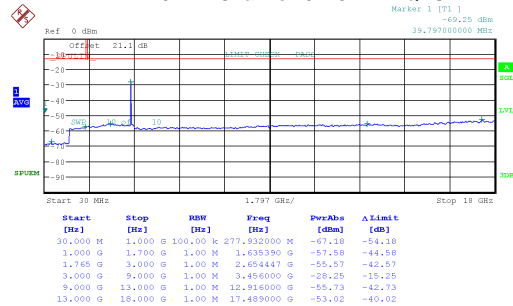
Date: 4.APR.6302 05:30:47

FDD-LTE 4 BW10MHz Channel20175 RB 1 16-QAM



Date: 4.APR.6302 05:35:15

FDD-LTE 4 BW10MHz Channel20175 RB 1 QPSK



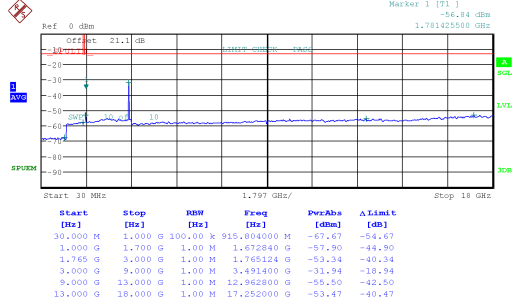
Date: 4.APR.6302 05:34:43



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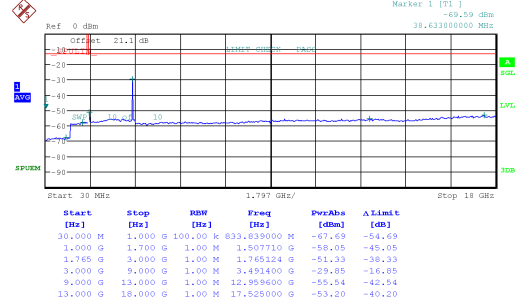
## FCC RF TEST REPORT

### FDD-LTE 4 BW10MHz Channel20350 RB 1 16-QAM



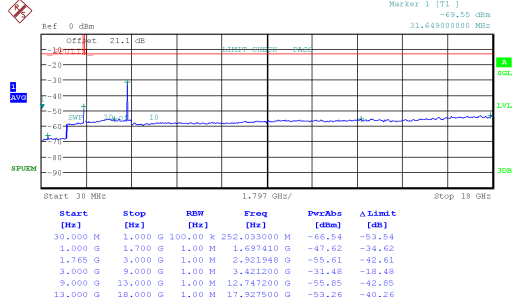
Date: 4.APR.6302 05:41:13

### FDD-LTE 4 BW10MHz Channel20350 RB 1 QPSK



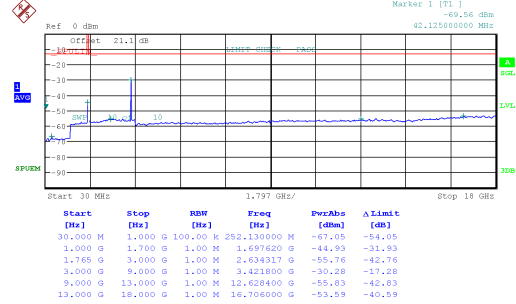
Date: 4.APR.6302 05:40:41

### FDD-LTE 4 BW15MHz Channel20025 RB 1 16-QAM



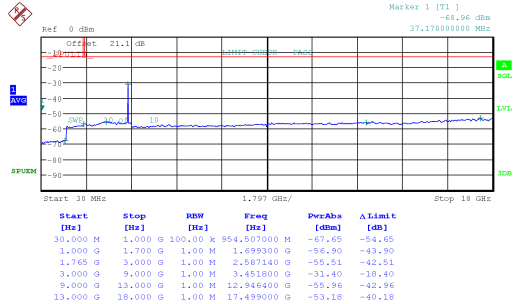
Date: 4.APR.6302 05:48:14

### FDD-LTE 4 BW15MHz Channel20025 RB 1 QPSK



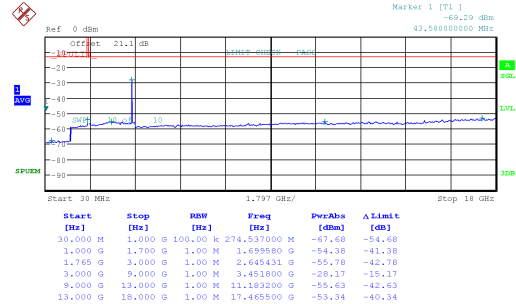
Date: 4.APR.6302 05:47:42

### FDD-LTE 4 BW15MHz Channel20175 RB 1 16-QAM



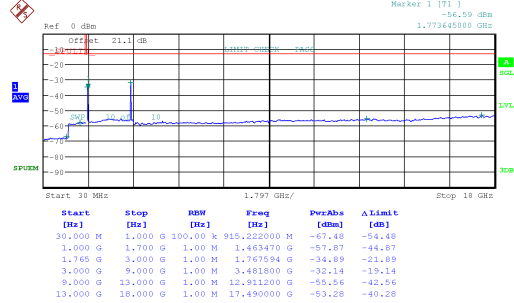
Date: 4.APR.6302 05:52:23

### FDD-LTE 4 BW15MHz Channel20175 RB 1 QPSK



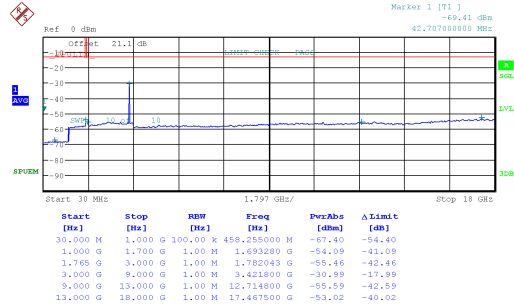
Date: 4.APR.6302 05:51:51

FDD-LTE 4 BW15MHz Channel20325 RB 1 16-QAM



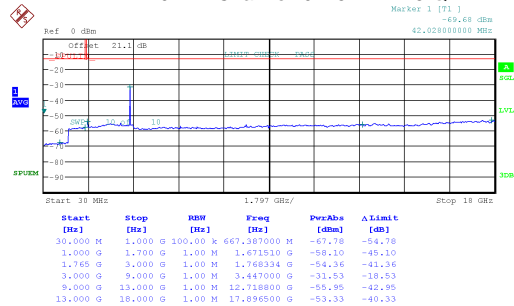
Date: 4.APR.6302 05:58:32

FDD-LTE 4 BW20MHz Channel20050 RB 1 16-QAM



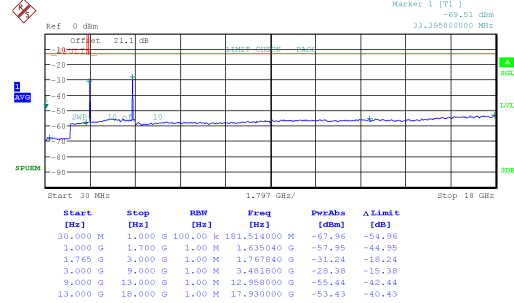
Date: 4.APR.6302 06:05:38

FDD-LTE 4 BW20MHz Channel20175 RB 1 16-QAM



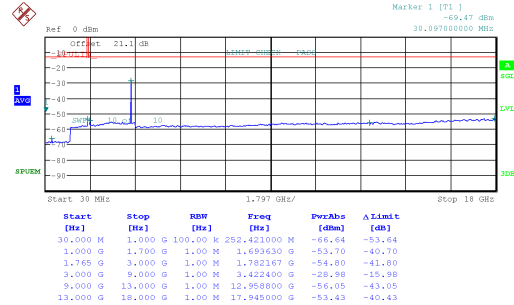
Date: 4.APR.6302 06:09:51

## FDD-LTE 4 BW15MHz Channel20325 RB 1 QPSK



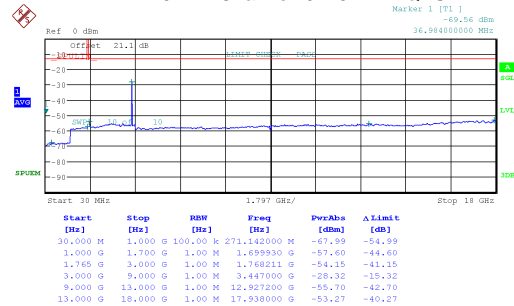
Date: 4.APR.6302 05:58:00

FDD-LTE 4 BW20MHz Channel20050 RB 1 QPSK



Date: 4.APR.6302 06:05:06

## FDD-LTE 4 BW20MHz Channel20175 RB 1 QPSK



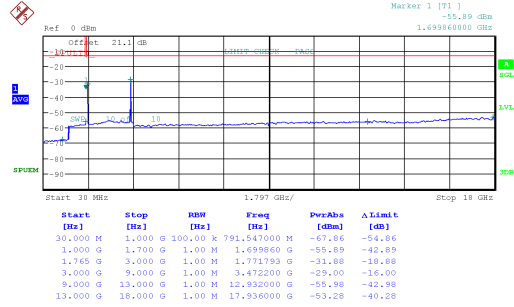
Date: 4.APR.6302 06:09:19



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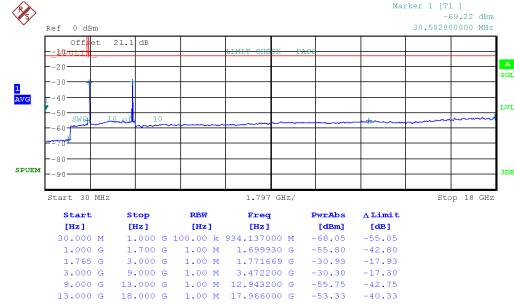
FCC RF TEST REPORT

FDD-LTE 4 BW20MHz Channel20300 RB 1 16-QAM



Date: 4.APR.6302 06:16:01

FDD-LTE 4 BW20MHz Channel20300 RB 1 QPSK



Date: 4.APR.6302 06:15:29



## 5.6 Frequency Stability

### 5.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency.

### 5.6.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

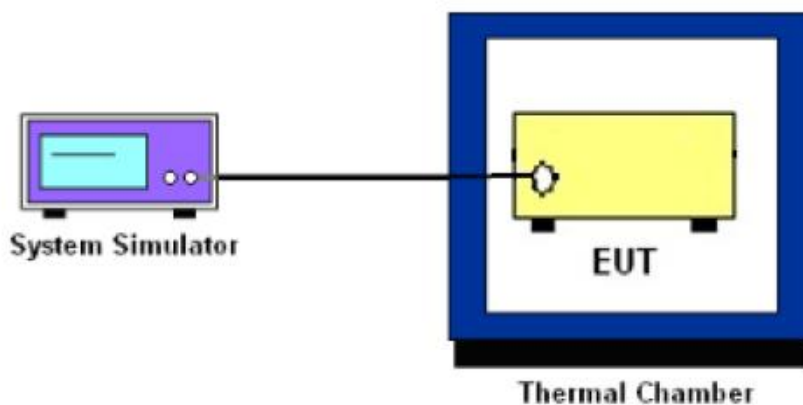
### 5.6.3 Test Procedure for Temperature Variation

- a. The EUT was set up in the thermal chamber and connected with the system simulator.
- b. With power OFF, the temperature was decreased to  $-20^{\circ}\text{C}$  and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- c. With power OFF, the temperature was raised in  $10^{\circ}\text{C}$  steps up to  $60^{\circ}\text{C}$ . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

### 5.6.4 Test Procedure for Voltage Variation

- a. The EUT was placed in a temperature chamber at  $25\pm 5^{\circ}\text{C}$  and connected with the system simulator.
- b. The power supply voltage to the EUT was varied from 3.42V to 4.18V of the nominal value measured at the input to the EUT.
- c. The variation in frequency was measured for the worst case.

### 5.6.5 Test Setup



### 5.6.6 Test Result

Test Result of Temperature Variation

Band :	FDD-LTE 2 (QPSK)	FDD-LTE 4 (QPSK)	Limit(ppm) :	2.5
Temperature	BW 10MHz Deviation(ppm)	BW 10MHz Deviation(ppm)	Result	
-20	0	0	PASS	
-10	0	0		
0	0	0		
10	0	0		
20(Ref.)	0	0		
30	0	0		
40	0	0		
50	0	0		
60	0	0		

Test Result of Voltage Variation

Band	Bandwidth	Voltage(Volt)	Deviation(ppm)	Limit(ppm)	Result
FDD-LTE 2(QPSK)	10M	LV	0	2.5	PASS
		NV	0		
		HV	0		





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FDD-LTE 4(QPSK)	10M	LV	0	2.5	PASS
		NV	0		
		HV	0		



## 5.7 Effective Radiated Power/Equivalent Isotropic Radiated Power

### 5.7.1 Description of ERP/EIRP Measurement

Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5 and 3 watts with LTE band 12/17.

Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2/25/7 and 1 watt with LTE band 4.

### 5.7.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.7.3 Test Procedures

Effective Isotropic Radiated Power (EIPR) was calculated with the correction factor,  $EIPR = \text{Conducted Output Power} + \text{Substitution antenna gain}$ .  $ERP = EIPR - 2.15$ .

### 5.7.4 Test Result

Band				FDD-LTE2		
BW [MHz]	Modulation	RB Size	RB Offset	EIRP(dBm) Low Ch./Freq.	EIRP(dBm) Middle Ch./Freq.	EIRP(dBm) High Ch./Freq.
Channel				18607	18900	19193
Frequency(MHz)				1850.7	1880	1909.3
Antenna Gain(dBi)				-0.68		
1.4	QPSK	1	Low	21.64	21.26	21.56
1.4	QPSK	1	Mid	21.43	21.41	21.32
1.4	QPSK	1	High	21.48	21.35	21.19
1.4	QPSK	3	Low	21.55	21.19	21.35
1.4	QPSK	3	High	21.33	21.12	21.19
1.4	QPSK	6	Low	20.44	20.21	20.38
1.4	16QAM	1	Low	21.23	20.39	20.7
1.4	16QAM	1	Mid	21.28	20.44	20.59
1.4	16QAM	1	High	21.03	20.19	20.52
1.4	16QAM	3	Low	20.69	20.46	20.43
1.4	16QAM	3	High	20.73	20.66	20.3
1.4	16QAM	6	Low	19.62	19.55	19.28
Channel				18615	18900	19185
Frequency(MHz)				1851.5	1880	1908.5
3	QPSK	1	Low	21.69	21.11	21.3



3	QPSK	1	Mid	21.68	21.35	21.42
3	QPSK	1	High	21.57	21.18	21.22
3	QPSK	8	Low	20.36	20.29	20.48
3	QPSK	8	High	20.34	20.29	20.2
3	QPSK	15	Low	20.37	20.2	20.48
3	16QAM	1	Low	20.47	20.14	20.66
3	16QAM	1	Mid	20.53	20.08	20.34
3	16QAM	1	High	20.41	20.21	20.18
3	16QAM	8	Low	19.41	19.46	19.53
3	16QAM	8	High	19.5	19.45	19.51
3	16QAM	15	Low	19.39	19.45	19.58
Channel				18625	18900	19175
Frequency(MHz)				1852.5	1880	1907.5
5	QPSK	1	Low	21.42	21.1	21.28
5	QPSK	1	Mid	21.62	21.32	21.3
5	QPSK	1	High	21.6	21.3	21.01
5	QPSK	12	Low	20.52	20.29	20.38
5	QPSK	12	High	20.45	20.27	20.1
5	QPSK	25	Low	20.47	20.27	20.35
5	16QAM	1	Low	20.67	19.96	19.84
5	16QAM	1	Mid	20.88	19.99	19.92
5	16QAM	1	High	20.74	20.08	19.48
5	16QAM	12	Low	19.3	19.25	19.47
5	16QAM	12	High	19.21	19.35	19.21
5	16QAM	25	Low	19.21	19.28	19.54
Channel				18650	18900	19150
Frequency(MHz)				1855	1880	1905
10	QPSK	1	Low	21.28	21.06	21.38
10	QPSK	1	Mid	21.43	21.36	21.41
10	QPSK	1	High	21.1	21.22	21.21
10	QPSK	25	Low	20.43	20.18	20.39
10	QPSK	25	High	20.23	20.28	20.14
10	QPSK	50	Low	20.31	20.27	20.25
10	16QAM	1	Low	20.95	19.96	20.49
10	16QAM	1	Mid	20.72	20.36	20.66
10	16QAM	1	High	20.23	19.94	20.41
10	16QAM	25	Low	19.47	19.47	19.44
10	16QAM	25	High	19.27	19.57	19.25
10	16QAM	50	Low	19.36	19.4	19.39
Channel				18675	18900	19125
Frequency(MHz)				1857.5	1880	1902.5
15	QPSK	1	Low	21.15	20.95	21.03



15	QPSK	1	Mid	21.16	21.19	21.25
15	QPSK	1	High	20.78	21.14	21.09
15	QPSK	36	Low	20.29	20.09	20.37
15	QPSK	36	High	20.15	20.16	20.16
15	QPSK	75	Low	20.21	20.16	20.29
15	16QAM	1	Low	20.6	20.06	20.58
15	16QAM	1	Mid	20.48	20.13	20.58
15	16QAM	1	High	20.8	19.58	20.18
15	16QAM	36	Low	19.38	19.15	19.44
15	16QAM	36	High	19.24	19.39	19.33
15	16QAM	75	Low	19.24	19.17	19.35
Channel				18700	18900	19100
Frequency(MHz)				1860	1880	1900
20	QPSK	1	Low	21.46	20.87	21.13
20	QPSK	1	Mid	21.76	21.46	21.42
20	QPSK	1	High	21.2	20.93	21.02
20	QPSK	50	Low	20.37	20.15	20.33
20	QPSK	50	High	20.11	20.15	20.19
20	QPSK	100	Low	20.18	20.12	20.34
20	16QAM	1	Low	20.05	20.61	20.87
20	16QAM	1	Mid	20.28	21.26	21.1
20	16QAM	1	High	19.86	20.55	20.54
20	16QAM	50	Low	19.36	19.18	19.46
20	16QAM	50	High	19.19	19.25	19.26
20	16QAM	100	Low	19.26	19.11	19.47

Band				FDD-LTE4		
BW [MHz]	Modulation	RB Size	RB Offset	EIRP(dBm) Low Ch./Freq.	EIRP(dBm) Middle Ch./Freq.	EIRP(dBm) High Ch./Freq.
Channel				19957	20175	20393
Frequency(MHz)				1710.7	1732.5	1754.3
Antenna Gain(dBi)				-0.13		
1.4	QPSK	1	Low	22.23	22	22.25
1.4	QPSK	1	Mid	22.01	22.12	22.31
1.4	QPSK	1	High	22.22	21.95	22.2
1.4	QPSK	3	Low	22.14	22.12	22.03
1.4	QPSK	3	High	22.18	22.12	22.04
1.4	QPSK	6	Low	21.09	21.23	21.15
1.4	16QAM	1	Low	21.28	21.15	21.19
1.4	16QAM	1	Mid	21.98	21.18	21.55



1.4	16QAM	1	High	21.98	21.04	21.13
1.4	16QAM	3	Low	21.06	21.18	21.59
1.4	16QAM	3	High	20.98	21.1	21.28
1.4	16QAM	6	Low	20.07	20.28	19.94
Channel				19965	20175	20385
Frequency(MHz)				1711.5	1732.5	2153.5
3	QPSK	1	Low	22.15	22.17	22
3	QPSK	1	Mid	22.03	22.38	22.39
3	QPSK	1	High	22.26	21.96	22.04
3	QPSK	8	Low	21.1	21.07	21.15
3	QPSK	8	High	21.13	21.14	21.06
3	QPSK	15	Low	21.23	21.18	21.19
3	16QAM	1	Low	21.36	21.15	21.22
3	16QAM	1	Mid	21.38	20.99	21.39
3	16QAM	1	High	21.61	21.06	21.43
3	16QAM	8	Low	20.22	20.41	20.35
3	16QAM	8	High	20.16	20.26	20.69
3	16QAM	15	Low	20.12	20.18	20.25
Channel				19975	20175	20375
Frequency(MHz)				1712.5	1732.5	1752.5
5	QPSK	1	Low	22.06	22.28	21.98
5	QPSK	1	Mid	22.02	22.2	22.19
5	QPSK	1	High	22.09	22.19	22.24
5	QPSK	12	Low	21.15	21.18	21.12
5	QPSK	12	High	21.15	21.12	21.14
5	QPSK	25	Low	21.16	21.16	21.19
5	16QAM	1	Low	21.52	21.29	20.67
5	16QAM	1	Mid	21.5	21.28	20.81
5	16QAM	1	High	21.37	21.18	20.99
5	16QAM	12	Low	19.99	20.3	20.18
5	16QAM	12	High	20.07	19.94	20.24
5	16QAM	25	Low	20.19	20.17	20.2
Channel				20000	20175	20350
Frequency(MHz)				1715	1732.5	1750
10	QPSK	1	Low	22	21.95	21.94
10	QPSK	1	Mid	22.07	22.16	22.37
10	QPSK	1	High	21.92	21.92	22.17
10	QPSK	25	Low	21.04	21.12	21.13
10	QPSK	25	High	21.16	21	21.03
10	QPSK	50	Low	21.02	21.06	21.08
10	16QAM	1	Low	21.58	20.67	21.38
10	16QAM	1	Mid	21.52	21.11	21.99



10	16QAM	1	High	21.89	20.48	21.38
10	16QAM	25	Low	20.39	20.25	20.25
10	16QAM	25	High	20.31	20.22	20.17
10	16QAM	50	Low	20.02	20.09	20.18
Channel				20025	20175	20325
Frequency(MHz)				1717.5	1732.5	1747.5
15	QPSK	1	Low	22.17	21.86	22.06
15	QPSK	1	Mid	21.97	21.97	22.36
15	QPSK	1	High	21.81	21.9	22.04
15	QPSK	36	Low	21.12	21.09	21.09
15	QPSK	36	High	20.9	21.03	20.93
15	QPSK	75	Low	20.97	20.99	21.01
15	16QAM	1	Low	21.57	21.14	21.45
15	16QAM	1	Mid	21.92	21.08	21.44
15	16QAM	1	High	21.9	20.92	21.46
15	16QAM	36	Low	20.16	20.22	20.17
15	16QAM	36	High	19.86	20.07	20.08
15	16QAM	75	Low	19.97	20.14	20.15
Channel				20050	20175	20300
Frequency(MHz)				1720	1732.5	1745
20	QPSK	1	Low	22.02	22.04	21.94
20	QPSK	1	Mid	22.42	22.25	22.44
20	QPSK	1	High	22.26	22.01	22.27
20	QPSK	50	Low	21.15	21.15	21.26
20	QPSK	50	High	20.97	21.01	21.11
20	QPSK	100	Low	21.01	21.06	21.07
20	16QAM	1	Low	21.07	21.74	21.63
20	16QAM	1	Mid	21.26	21.95	21.64
20	16QAM	1	High	20.96	21.62	21.17
20	16QAM	50	Low	20.18	20.14	20.22
20	16QAM	50	High	20.03	20.12	20.11
20	16QAM	100	Low	20.07	20.09	20.1



## 5.8 Radiated Spurious Emission

### 5.8.1 Description of Radiated Spurious Emission

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

For Band 7, 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emission in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIPR) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

### 5.8.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

### 5.8.3 Test Procedures

- a. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
- b. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- d. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
- e. Make the measurement with the spectrum analyzers RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- f. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- g. Tune the output power of signal generator to the same emission level with EUT



maximum spurious emission.

- h. Taking the record of output power at antenna port.
- i. Repeat step f to step g for another polarization.
- j. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from  $43 + 10 \log(P)$  dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10 \log(P)](dB)$$

$$= [30 + 10 \log(P)](dBm) - [43 + 10 \log(P)](dB)$$

$$= -13dBm.$$

For Band7, 38, 41

The limit line is derived from  $55 + 10 \log(P)$  dB below the transmitter power P(Watts).

$$= P(W) - [55 + 10 \log(P)](dB)$$

$$= [30 + 10 \log(P)](dBm) - [55 + 10 \log(P)](dB)$$

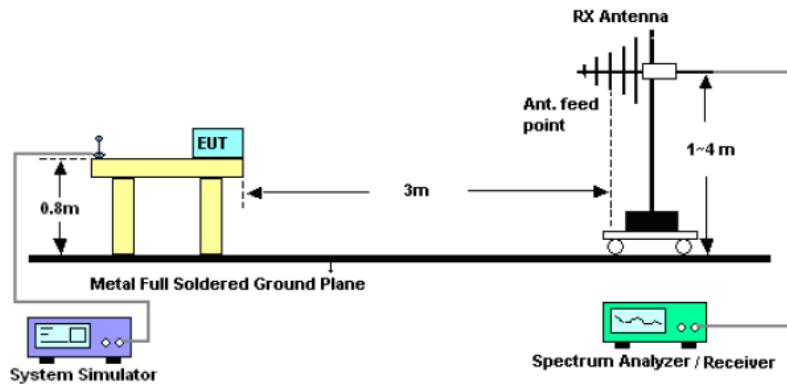
$$= -25dBm.$$

- k. EIRP (dBm) = S.G.Power – Tx Cable Loss + Tx Antenna Gain.
- l. ERP (dBm) = EIRP-2.15.

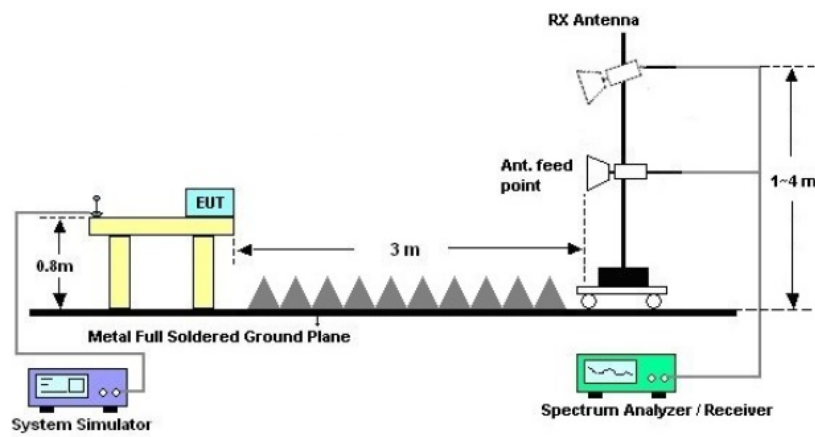


## 5.8.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

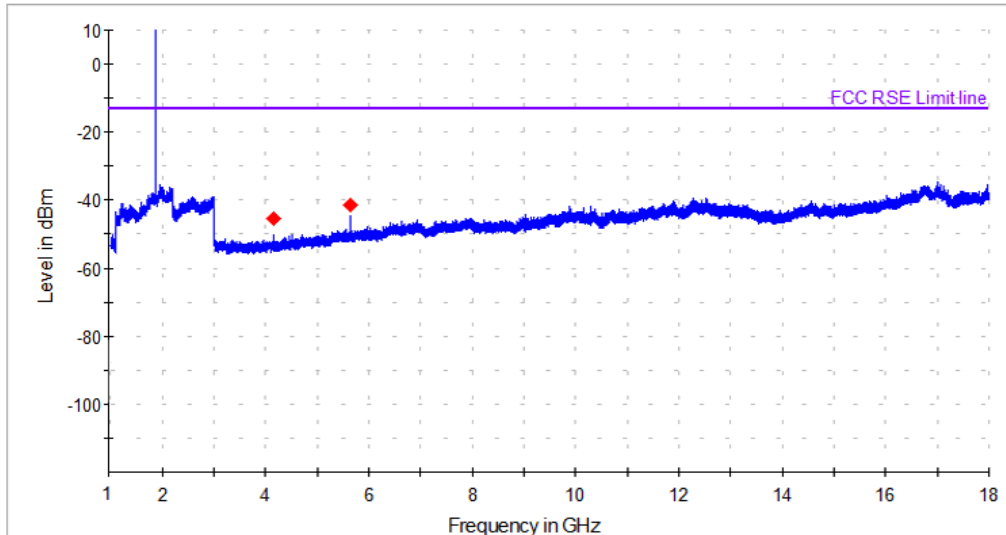




### 5.8.5 Test Result

Spurious emissions below 1GHz were found more than 20dB below limit line

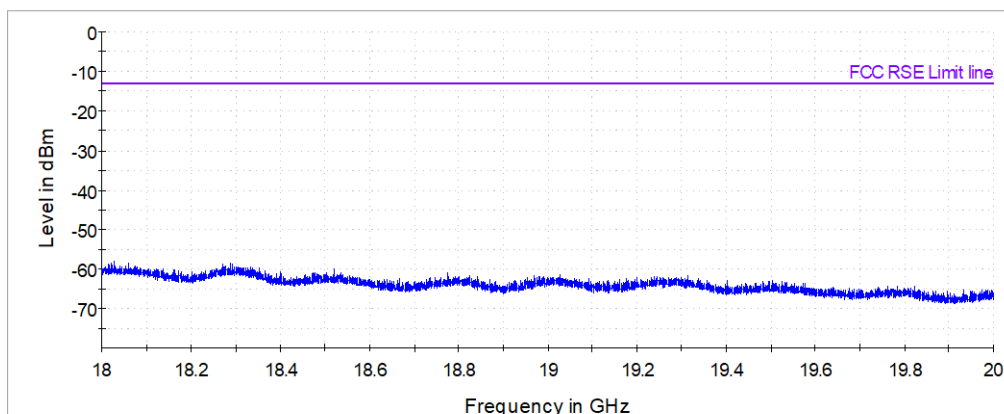
LTE Band 2 (BW=1.4MHz, position 1)



Frequency	MaxPeak	Limit	Margin	SG	Cable loss	Gain	Read	Height	Pol	Azimuth
MHz	dBm	dBm	dB	dBm	dB	dB	dBuV	cm		deg
4156.826666	-45.37	-13	32.37	-49.2	3.02	6.85	44.03	147.7	H	202
5638.653667	-41.25	-13	28.25	-44.5	4.30	7.55	43.45	156.1	H	326

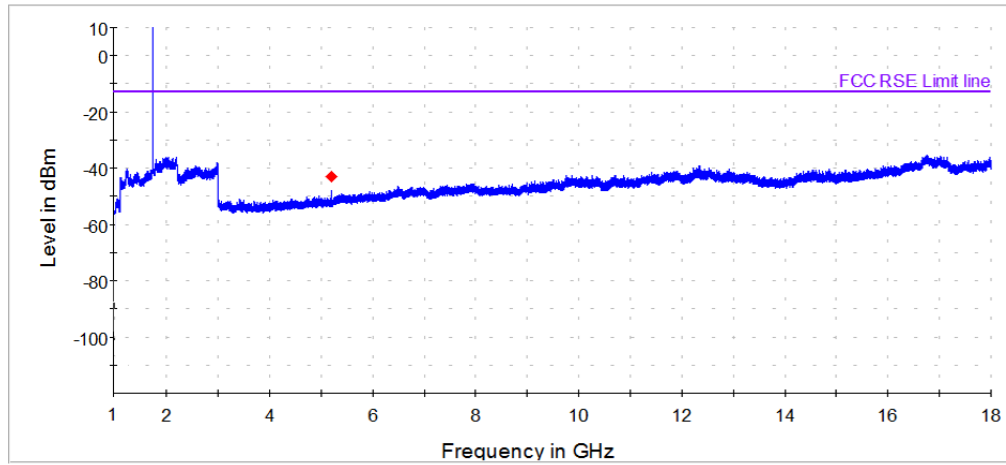
EIRP=SG Power - cable loss + Tx ant gain

ERP=EIRP-2.15





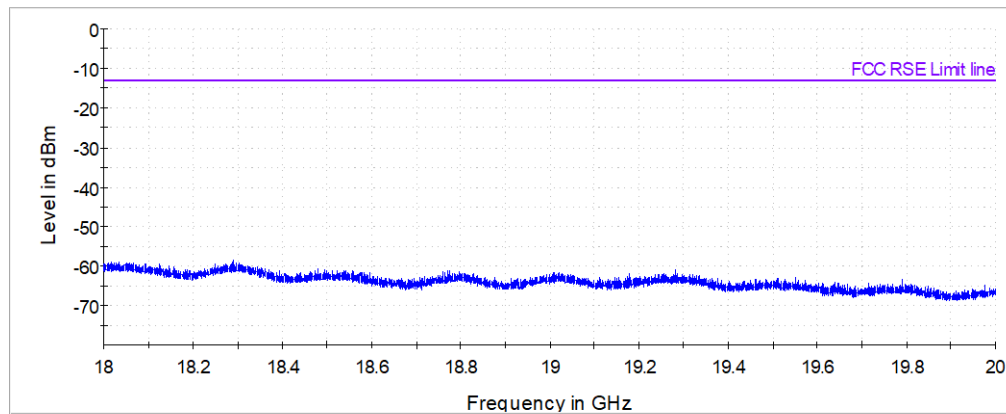
LTE Band4 ( BW=5MHz , position 1 )



Frequency	MaxPeak	Limit	Margin	SG	Cable loss	Gain	Read	Height	Pol	Azimuth
MHz	dBm	dBm	dB	dBm	dB	dB	dBuV	cm		deg
5190.730334	-43.09	-13.00	30.09	-46.6	4.14	7.65	43.91	155.2	H	299.0

EIRP=SG Power - cable loss + Tx ant gain

ERP=EIRP-2.15





## **6 SAMPLE PICTURE**

Reference attachment : EUT and Test setup Potographs.



## **7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES**

We, BYD Precise Manufacture Co., Ltd., were founded in 2007 to provide our best service in RF, Radio consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

**USA**

A2LA

**Certificate No.:** 4886.01

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

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