



MOBILE DEVICES BUSINESS

**PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY**

EMC TEST REPORT

Test Report Number – 24934-1 LTE

Report Date – June 6, 2012

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature: 

Name: Albert J. Patapack

Title: EMC Engineer

Date: June 6, 2012

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THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY UKAS OR ANY AGENCY OF THE U.S. GOVERNMENT.



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Test Report Details

Tests Performed By: ADR Testing Service
 Location Code: ADR LV
 Motorola Mobility Inc
 Product Safety and Compliance Group
 600 North US Hwy 45
 Libertyville, IL 60048
 FCC Registration Number: 316588
 Industry Canada Number: 109O-1

Tests Requested By: Motorola Mobility Inc.
 600 North US Hwy 45
 Libertyville, IL 60048

Product Type: Cellular Phone

Signaling Capability: GSM 850/1900, WCDMA 850/1700/1900
 HSDPA, HSUPA, EDGE, GPRS, 802.11a/b/g/n,
 LTE Band 4/17, Bluetooth LE + EDR

FCC ID: IHDP56MB4

Serial Numbers: LDNB270024, LDNB270027, LDNB270033

Testing Complete Date: May 15, 2012

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

- X Part 2
- X Part 27

Applicable Standards: ANSI 63.4 2003, ANSI/TIA-603-C-2004, RSS-Gen Issue 3, RSS-129 Issue 2, RSS-132 Issue 2, RSS-133 Issue 5, RSS-139 Issue 2

Summary of Testing

Test #	Test Name	Pass/Fail
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	Pass
3	Occupied Bandwidth	Pass
4	Band Edge	Pass
5	Spurious Emissions at Antenna Terminal	Pass
6	Field Strength of Spurious Emissions	Pass
7	Frequency Stability	Pass

Test #	Test Name	Margin with respect to the Limit
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	See results
3	Occupied Bandwidth	See Plots
4	Band Edge	See Plots
5	Spurious Emissions at Antenna Terminal	See Plots
6	Field Strength of Spurious Emissions	See results
7	Frequency Stability	See results

The margin with respect to the limit is the minimum margin for all modes and bands.

General and Special Conditions

This product utilizes an internal battery that is not removable. When applicable, EMC testing was performed with the internal battery fully charged. Where the internal battery could not be used due to the need for a controlled variation of input voltage, the internal battery was disconnected and an external power supply was utilized.

In addition to the GSM and WCDMA bands, the EUT operates on LTE Band 4 and LTE Band 17. The transmitting frequency range for LTE Band 4 is 1710MHz to 1755MHz and for LTE Band 17 is 704MHz to 716MHz. The EUT supports bandwidths of 5MHz, 10 MHz and 15MHz for LTE Band 4 and bandwidths of 5MHz and 10 MHz for LTE Band 17. The EUT supports both QPSK and 16 QAM modulation schemes.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

Equipment List

Manufacturer	Equipment Type	Model No.	Serial Number	Calibration Due Date
Rohde & Schwarz	Receiver	ESIB40	100226	3/30/2012
Rohde & Schwarz	Receiver	ESIB40	100001	12/20/2012
Hewlett Packard	EMC Analyzer	E7405	US39440191	9/23/2012
Agilent	MXA Signal Analyzer	N9020A	US46470586	1/20/2014
Agilent	Signal Generator	83712A	3429A00286	3/26/2013
ETS	DRG Horn Antenna	3115	6222	3/16/2012
A. H. Systems	DRG Horn Antenna	SAS 200/571	265	1/18/2013
A. H. Systems	DRG Horn Antenna	SAS 200/571	365	8/24/2012
ETS	Log-Periodic Antenna	3148	1188	12/12/2012
ETS	Biconical Antenna	3110B	3369	12/14/2012
Attenuator	Weinschel	AS-6	6675	NCR
Attenuator	Weinschel	AS-6	6677	NCR
Thermotron	Environmental Chamber	S-4	31580	11/16/2012
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	113924	9/21/2012
Agilent	Microwave Preamplifier	8449B	3008A01442	9/22/2012

Note that the signal generator and MXA signal analyzer are on a two-year calibration cycle. All other equipment is on a one-year calibration cycle. All testing was performed using equipment that was within calibration at the time that the test was performed. No equipment listed in the table above was used after the specified calibration due date. If, during the course of product testing, a piece of equipment went out of calibration and that piece of equipment was needed to complete product testing, a similar piece of calibrated equipment was substituted. If a substitution was made, that new piece of equipment would be listed in the above table along with the piece that was removed from service.

Measurement Procedures and Data

RF POWER OUTPUT

Measurement Procedure

The RF output port of the Equipment Under Test, EUT, is directly coupled to the input of a Wideband Communication Tester through a 20dB passive attenuator, adaptor (if needed), and specialized RF connector. The average output power is measured.

Measurement Results

LTE Band 4 15MHz BW		Conducted power (dBm) for LTE modes			
		QPSK, Start RB: 0, RB Alloc: 1	QPSK, Start RB: 74, RB Alloc: 1	QPSK, Start RB: 18, RB Alloc: 38	QPSK, Start RB: 0, RB Alloc: 75
<i>Frequency</i>	<i>Channel</i>				
1717.5 MHz	20025	24.13	23.78	23.13	23.16
1732.5 MHz	20175	23.78	23.60	22.61	22.66
1747.5 MHz	20325	23.61	23.75	22.77	22.74

LTE Band 4 15MHz BW		Conducted power (dBm) for LTE modes			
		16-QAM, Start RB: 0, RB Alloc: 1	16-QAM, Start RB: 74, RB Alloc: 1	16-QAM, Start RB: 18, RB Alloc: 38	16-QAM, Start RB: 0, RB Alloc: 75
<i>Frequency</i>	<i>Channel</i>				
1717.5 MHz	20025	23.36	22.98	22.29	22.20
1732.5 MHz	20175	23.13	22.95	21.66	21.70
1747.5 MHz	20325	22.75	22.95	21.85	21.79

LTE Band 4 10MHz BW		Conducted power (dBm) for LTE modes			
		QPSK, Start RB: 0, RB Alloc: 1	QPSK, Start RB: 49, RB Alloc: 1	QPSK, Start RB: 12, RB Alloc: 25	QPSK, Start RB: 0, RB Alloc: 50
<i>Frequency</i>	<i>Channel</i>				
1715.0 MHz	20000	23.94	24.00	23.05	23.09
1732.5 MHz	20175	23.69	23.57	22.50	22.61
1750.0 MHz	20350	23.57	23.54	22.73	22.74

LTE Band 4 10MHz BW		Conducted power (dBm) for LTE modes			
		16-QAM, Start RB: 0, RB Alloc: 1	16-QAM, Start RB: 49, RB Alloc: 1	16-QAM, Start RB: 12, RB Alloc: 25	16-QAM, Start RB: 0, RB Alloc: 50
<i>Frequency</i>	<i>Channel</i>				
1715.0 MHz	20000	22.90	22.75	22.25	22.35
1732.5 MHz	20175	22.62	22.51	21.70	21.83
1750.0 MHz	20350	22.42	22.68	21.97	22.02

LTE Band 4 5MHz BW		Conducted power (dBm) for LTE modes			
		QPSK, Start RB: 0, RB Alloc: 1	QPSK, Start RB: 24, RB Alloc: 1	QPSK, Start RB: 6, RB Alloc: 13	QPSK, Start RB: 0, RB Alloc: 25
<i>Frequency</i>	<i>Channel</i>				
1712.5 MHz	19975	24.25	24.08	23.11	23.19
1732.5 MHz	20175	23.67	23.57	22.46	22.63
1752.5 MHz	20375	23.88	23.68	22.72	22.91

LTE Band 4 5MHz BW		Conducted power (dBm) for LTE modes			
		16-QAM, Start RB: 0, RB Alloc: 1	16-QAM, Start RB: 24, RB Alloc: 1	16-QAM, Start RB: 6, RB Alloc: 13	16-QAM, Start RB: 0, RB Alloc: 25
<i>Frequency</i>	<i>Channel</i>				
1712.5 MHz	19975	23.30	23.32	22.04	22.79
1732.5 MHz	20175	23.01	22.86	21.42	22.06
1752.5 MHz	20375	23.26	22.82	21.75	22.30

LTE Band 17 10MHz		Conducted power (dBm) for LTE modes			
		QPSK, Start RB: 0, RB Alloc: 1	QPSK, Start RB: 49, RB Alloc: 1	QPSK, Start RB: 12, RB Alloc: 25	QPSK, Start RB: 0, RB Alloc: 50
<i>Frequency</i>	<i>Channel</i>				
710.0 MHz	23790	23.82	23.57	22.91	22.95

LTE Band 17 10MHz		Conducted power (dBm) for LTE modes			
		16-QAM, Start RB: 0, RB Alloc: 1	16-QAM, Start RB: 49, RB Alloc: 1	16-QAM, Start RB: 12, RB Alloc: 25	16-QAM, Start RB: 0, RB Alloc: 50
<i>Frequency</i>	<i>Channel</i>				
710.0 MHz	23790	22.61	22.52	22.19	22.17

LTE Band 17 5MHz		Conducted power (dBm) for LTE modes			
		QPSK, Start RB: 0, RB Alloc: 1	QPSK, Start RB: 24, RB Alloc: 1	QPSK, Start RB: 6, RB Alloc: 13	QPSK, Start RB: 0, RB Alloc: 25
<i>Frequency</i>	<i>Channel</i>				
706.5 MHz	23755	23.79	23.83	22.78	22.90
713.5 MHz	23825	24.03	23.59	22.82	22.78

LTE Band 17 5MHz		Conducted power (dBm) for LTE modes			
		16-QAM, Start RB: 0, RB Alloc: 1	16-QAM, Start RB: 24, RB Alloc: 1	16-QAM, Start RB: 6, RB Alloc: 13	16-QAM, Start RB: 0, RB Alloc: 25
<i>Frequency</i>	<i>Channel</i>				
706.5 MHz	23755	23.17	23.33	21.69	22.33
713.5 MHz	23825	22.81	23.07	21.63	22.21

RADIATED POWER

§27.50 (c) (10), §27.50 (d) (4)

Measurement Procedure

The EUT was tested in a 5 meter anechoic chamber with a 2-axis position system that permits taking complete spherical scans of the EUT’s radiation patterns. For all tests, the EUT was supported in a free space type environment, vertically oriented in the chamber.

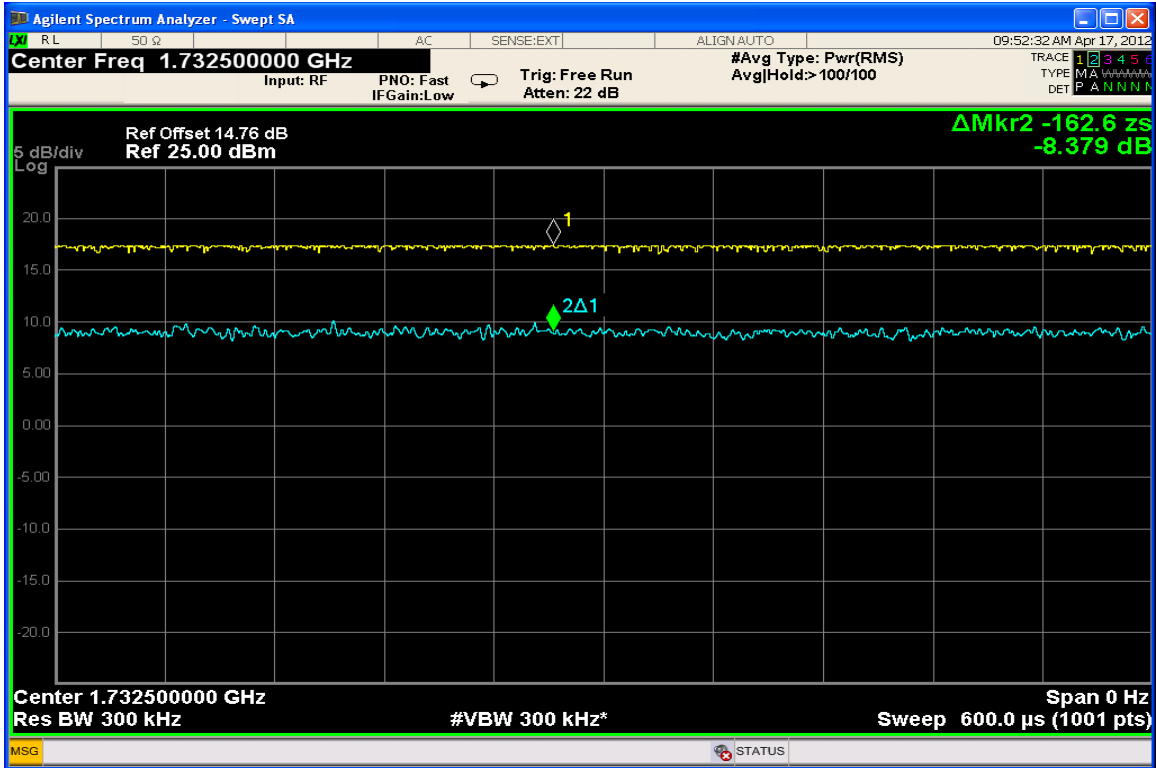
All measurements were made with the EUT placed in a call using a mobile station test set. The EUT was weakly coupled to the test set and configured to transmit in the below RB configurations. Radiated power was measured at each 15 degree step. The radiated power was measured using a Rhode & Schwarz FSP Spectrum Analyzer using the Average Detector for both LTE Band 4 and Band 17. From these measurements, the software calculates the angle at which maximum radiated power occurs for each case, and the radiated power at this angle was extracted from the data. To get ERP (Effective Radiated Power referenced to a half-wave dipole), subtract 2.1 dB from these numbers.

The EUT was tested under all configurations and modulations with the worst cases reported in the table below.

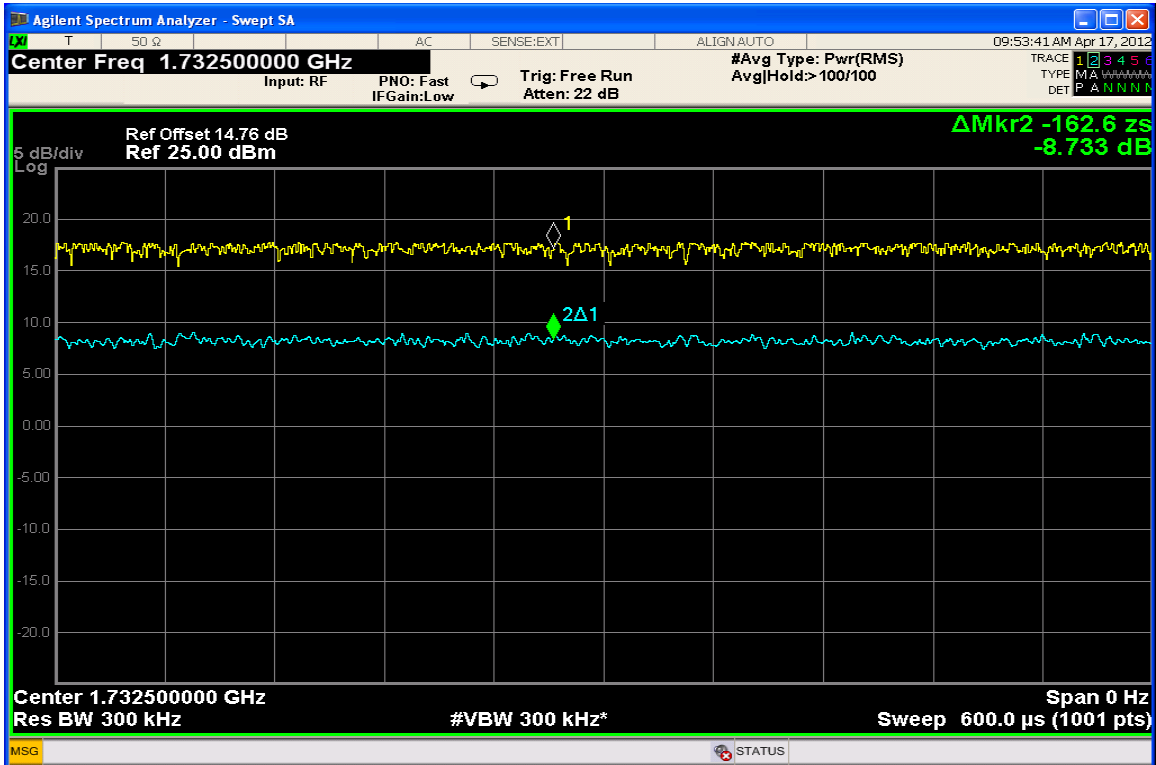
Measurement Results

Band	EIRP dBm	ERP dBm
Band 4 5MHz QPSK	27.3	25.2
Band 4 5MHz 16QAM	26.3	24.2
Band 4 10MHz QPSK	27.1	25.0
Band 4 10MHz 16QAM	26.1	24.0
Band 4 15MHz QPSK	27.4	25.3
Band 4 15MHz 16QAM	26.5	24.4
Band 17 5MHz QPSK	21.5	19.4
Band 17 5MHz 16QAM	20.8	18.7
Band 17 10MHz QPSK	21.3	19.2
Band 17 10MHz 16QAM	20.1	18.0

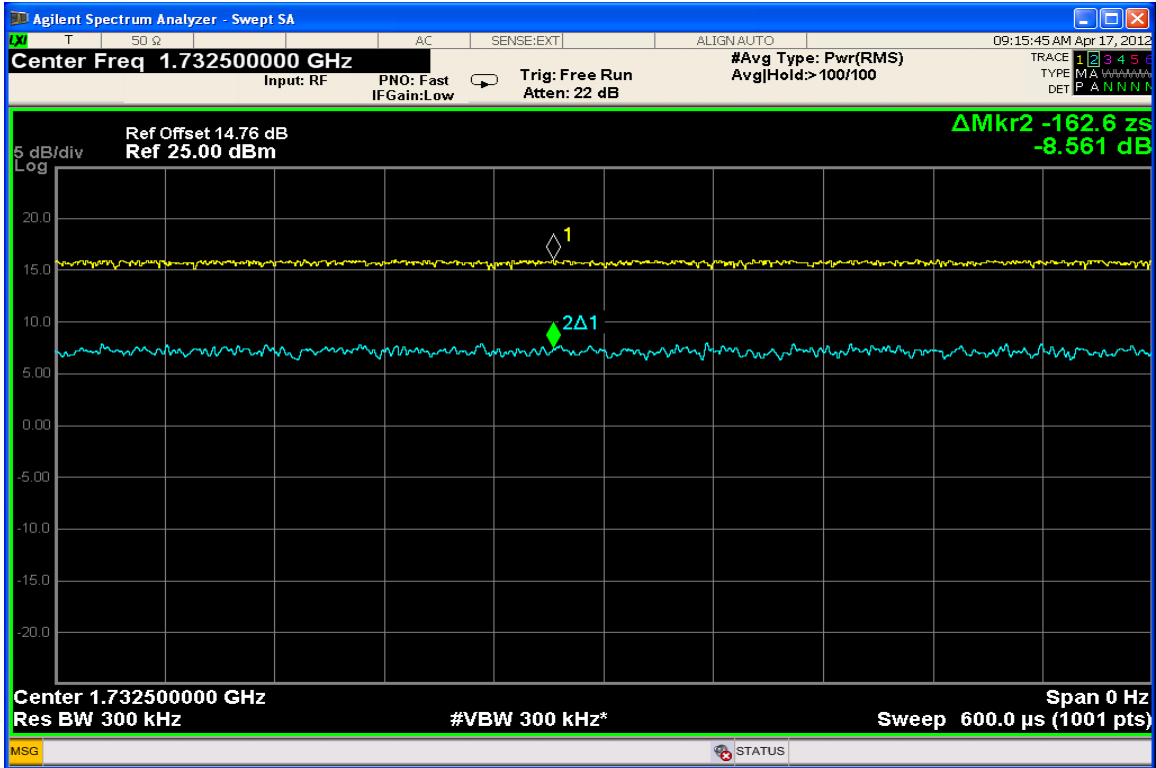
For the PAR plots below, except for the detector used and the trace type, all instrument settings are the same for both plot traces. The trace 1 type is Max Hold and the detector is peak. The trace 2 type is average and the detector is average.



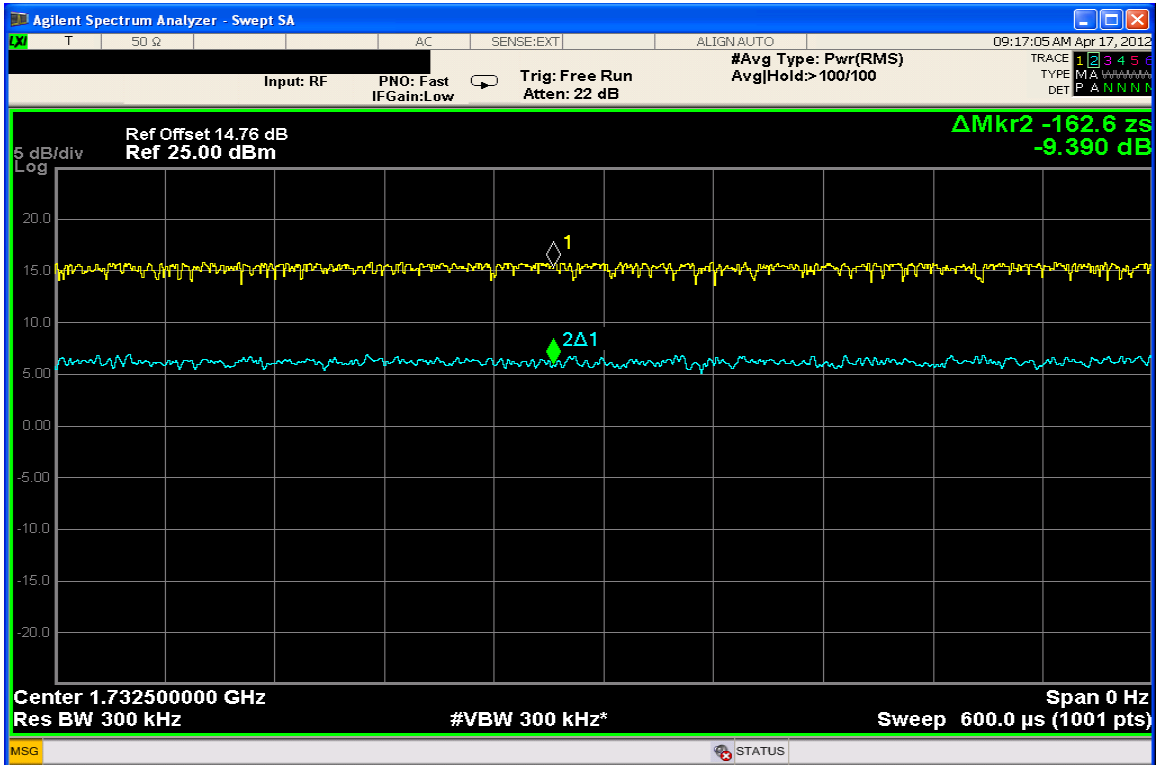
LTE Band 4 PAR Plot (10MHz BW, QPSK RB Size = 50 RB Start 0)



LTE Band 4 PAR Plot (10MHz BW, 16QAM RB Size = 50 RB Start 0)



LTE Band 4 PAR Plot (15MHz BW, QPSK RB Size = 75 RB Start 0)



LTE Band 4 PAR Plot (15MHz BW, 16QAM RB Size = 75 RB Start 0)

OCCUPIED BANDWIDTH

§ 2.1049

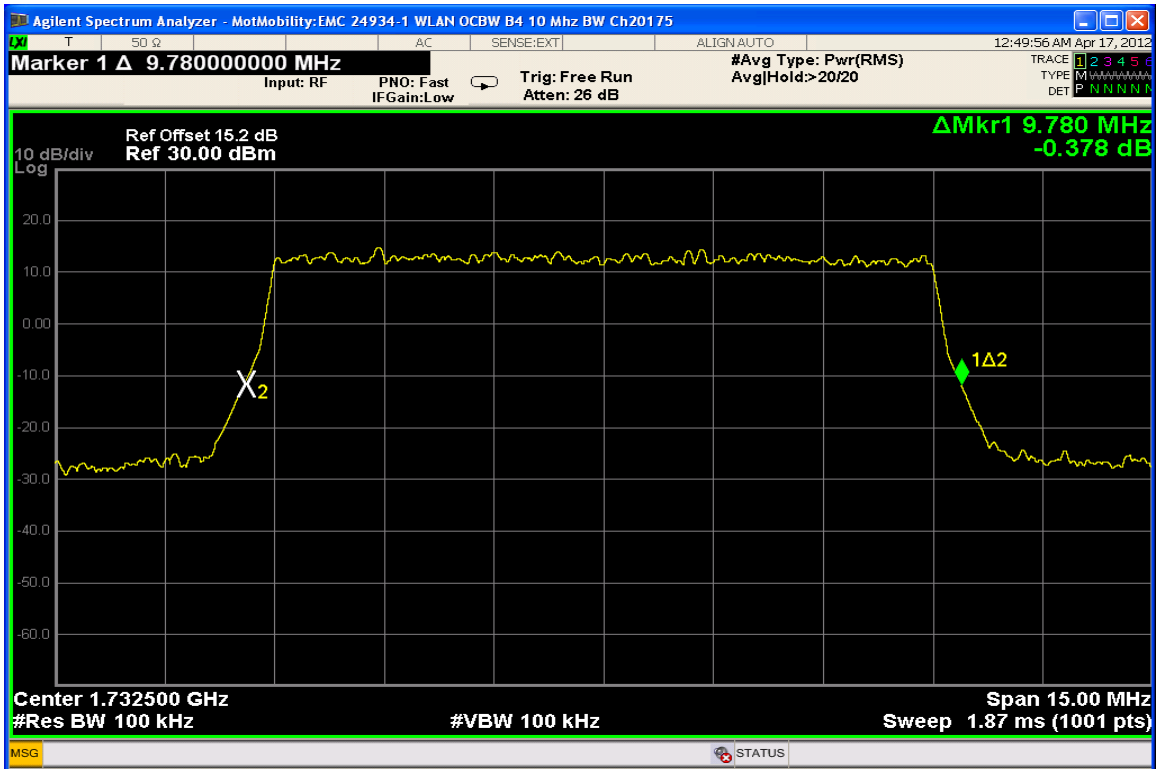
Measurement Procedure

The RF output port of the EUT is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector and each trace is set for Max Hold. The fully charged internal battery was used for the supply voltage.

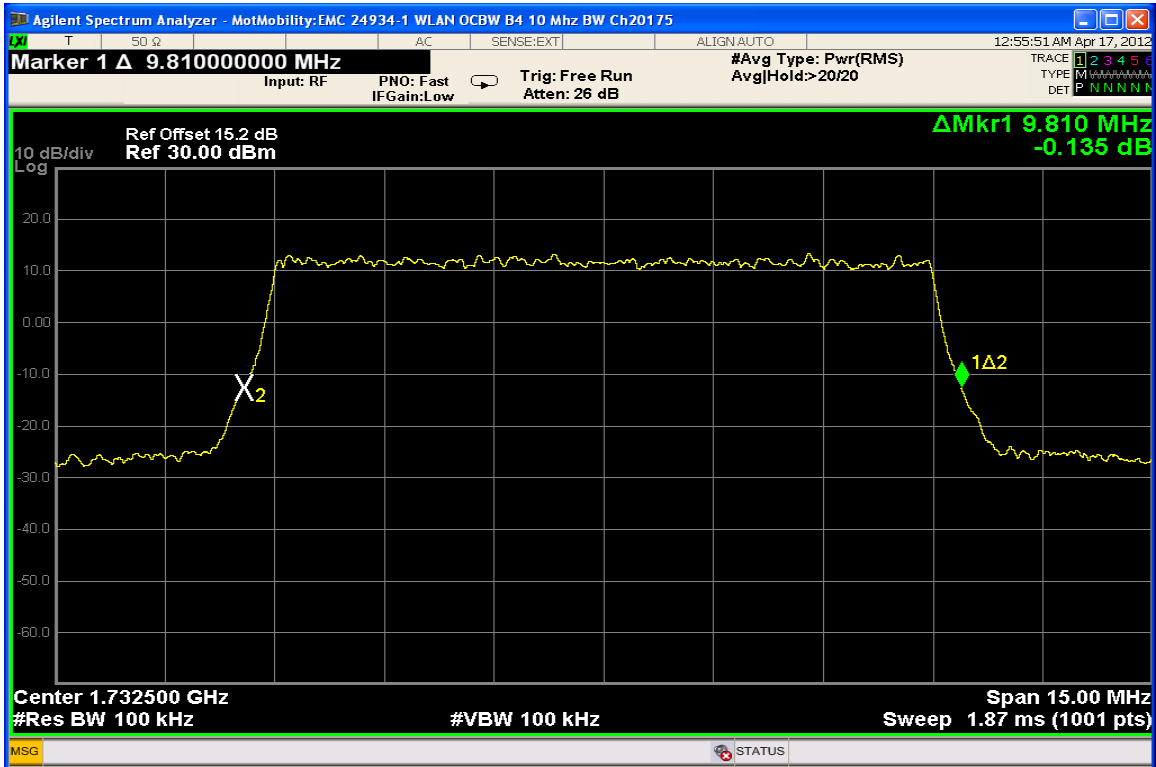
The EUT was tested under all configurations and modulations with the worst cases reported in the plots below.

Measurement Results

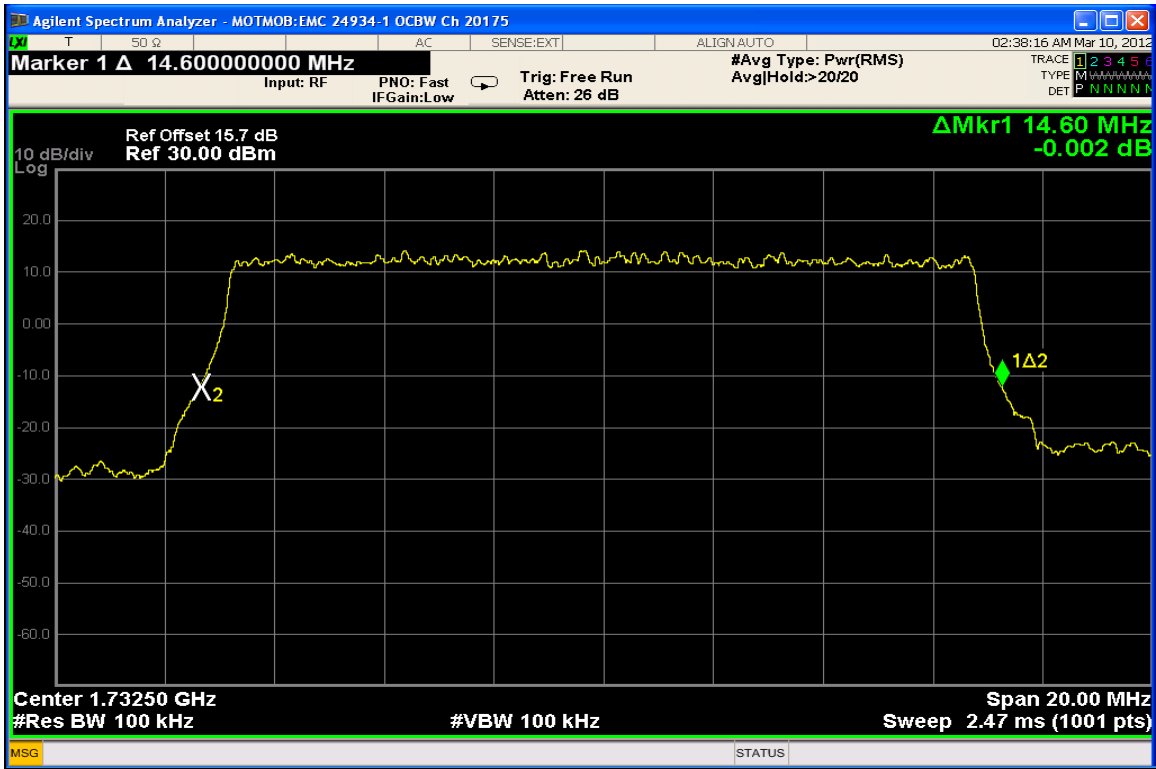
Attached



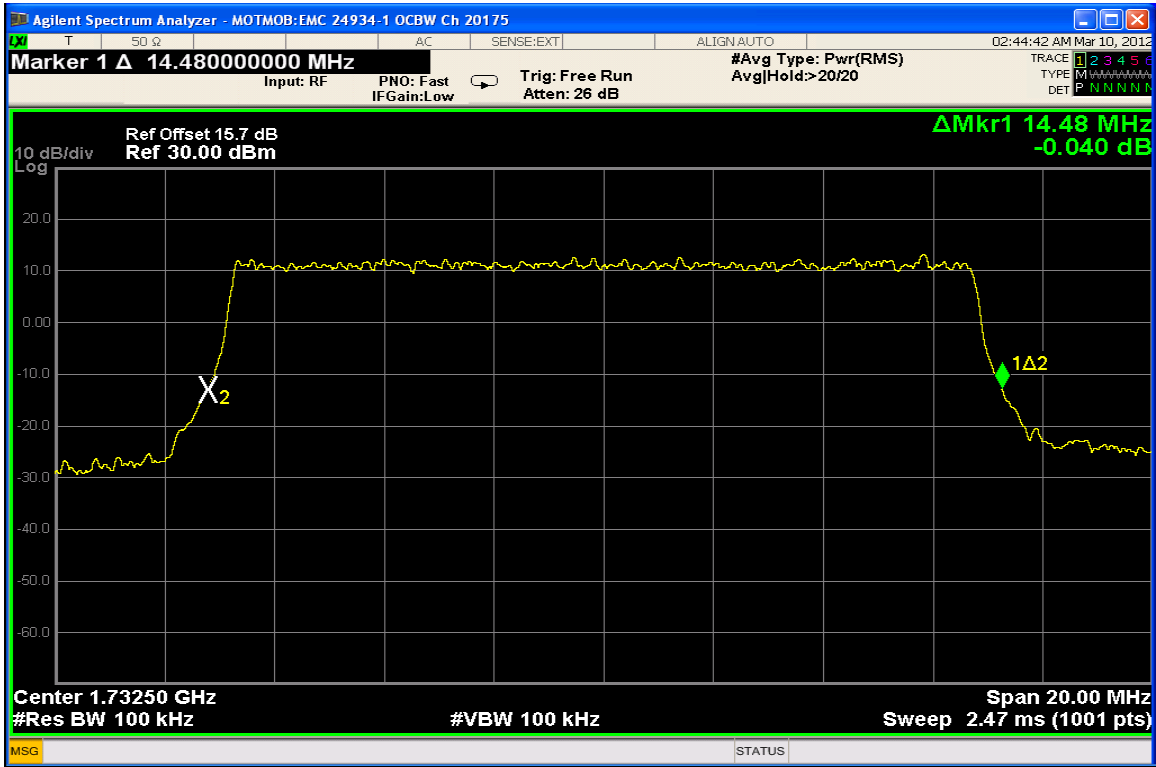
Band 4 LTE - 10MHz BW, QPSK RB Size = 50 RB Start 0



Band 4 LTE - 10MHz BW, 16QAM RB Size = 50 RB Start 0



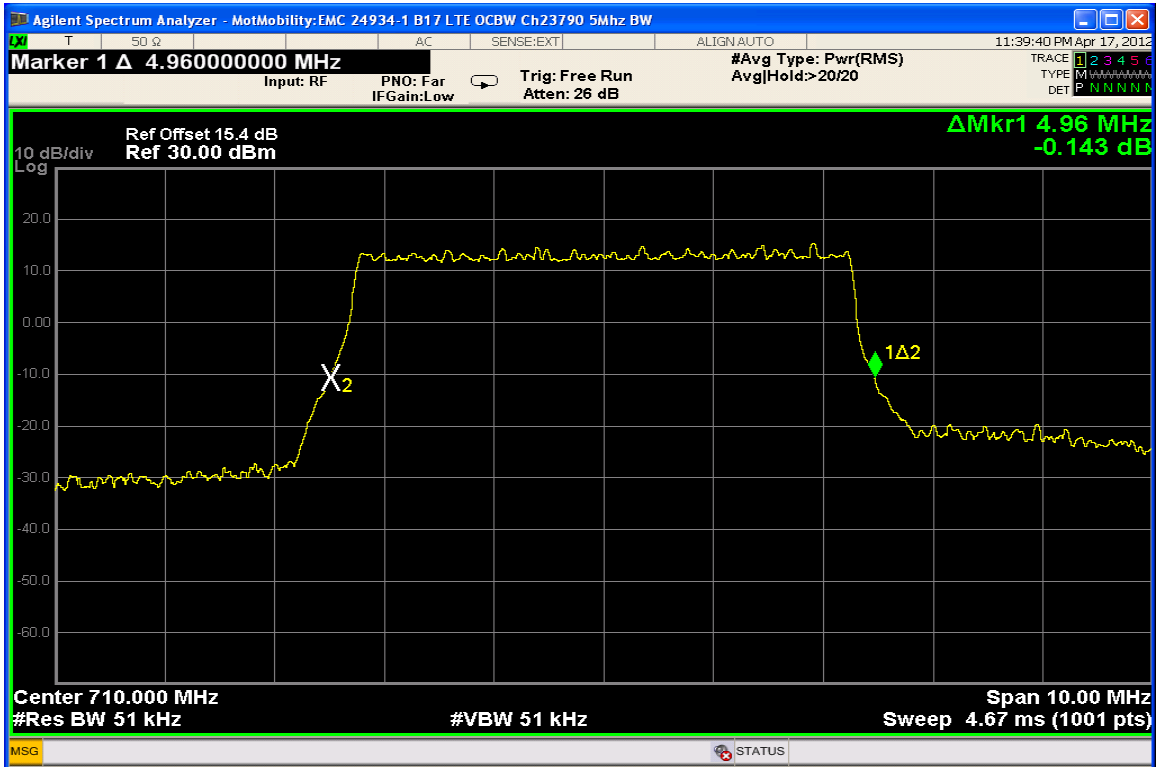
Band 4 LTE - 15MHz BW, QPSK RB Size = 75 RB Start 0



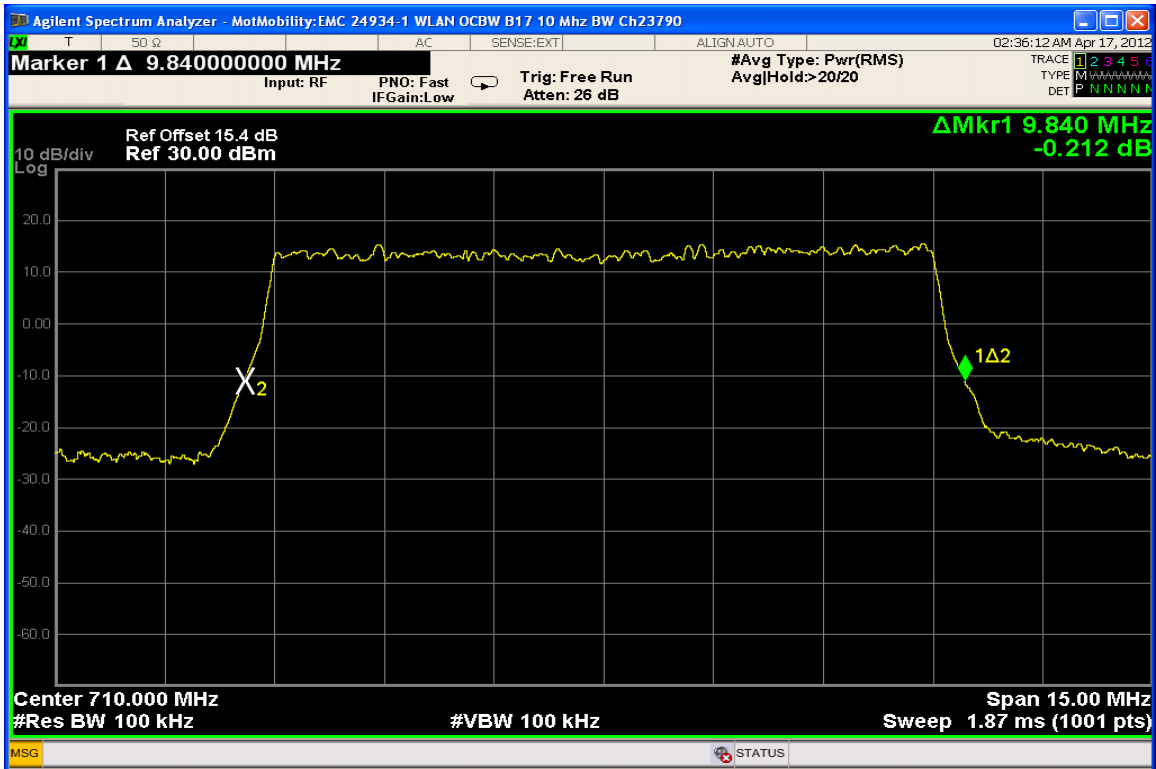
Band 4 LTE - 15MHz BW, 16QAM RB Size = 75 RB Start 0



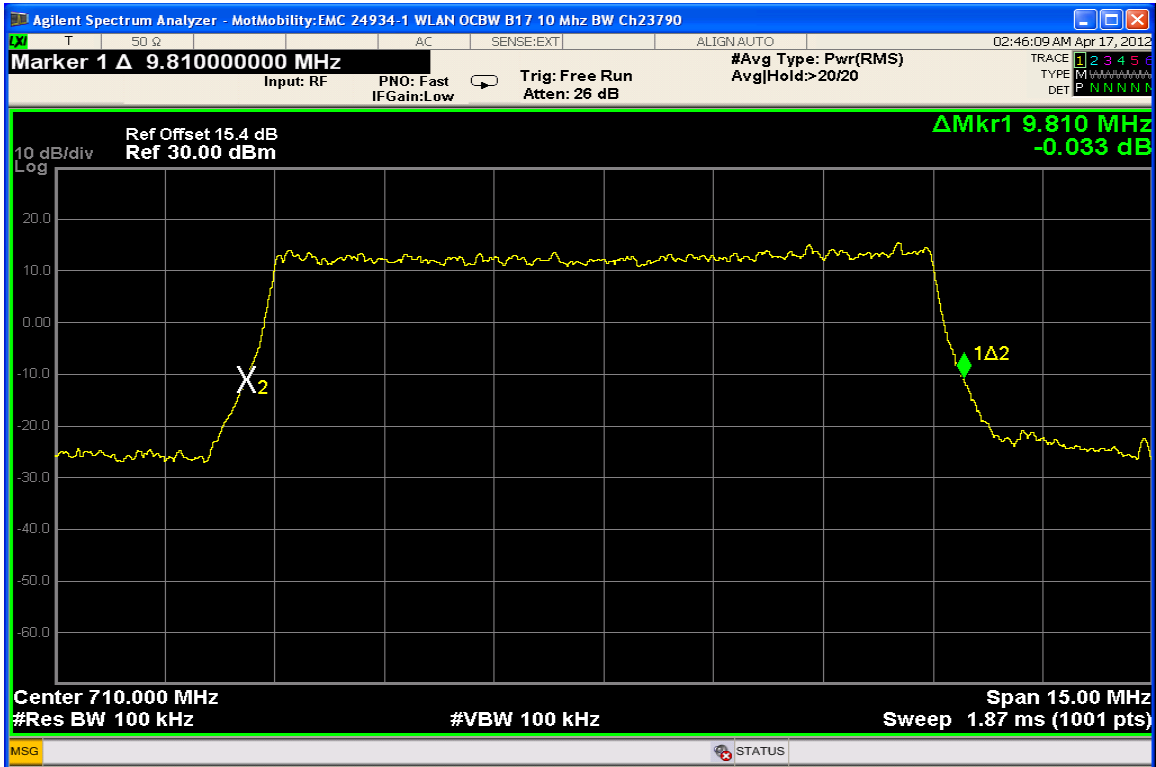
Band 17 LTE - 5MHz BW, QPSK RB Size = 25 RB Start 0



Band 17 LTE - 5MHz BW, 16QAM RB Size = 25 RB Start 0



Band 17 LTE - 10MHz BW, QPSK RB Size = 50 RB Start 0



Band 17 LTE - 10MHz BW, 16QAM RB Size = 50 RB Start 0

BAND EDGE MEASUREMENTS

§27.53 (g), §27.53 (h)

Measurement Procedure

The RF output port of the EUT is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector and each trace is set for Max Hold. The fully charged internal battery was used for the supply voltage.

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB.

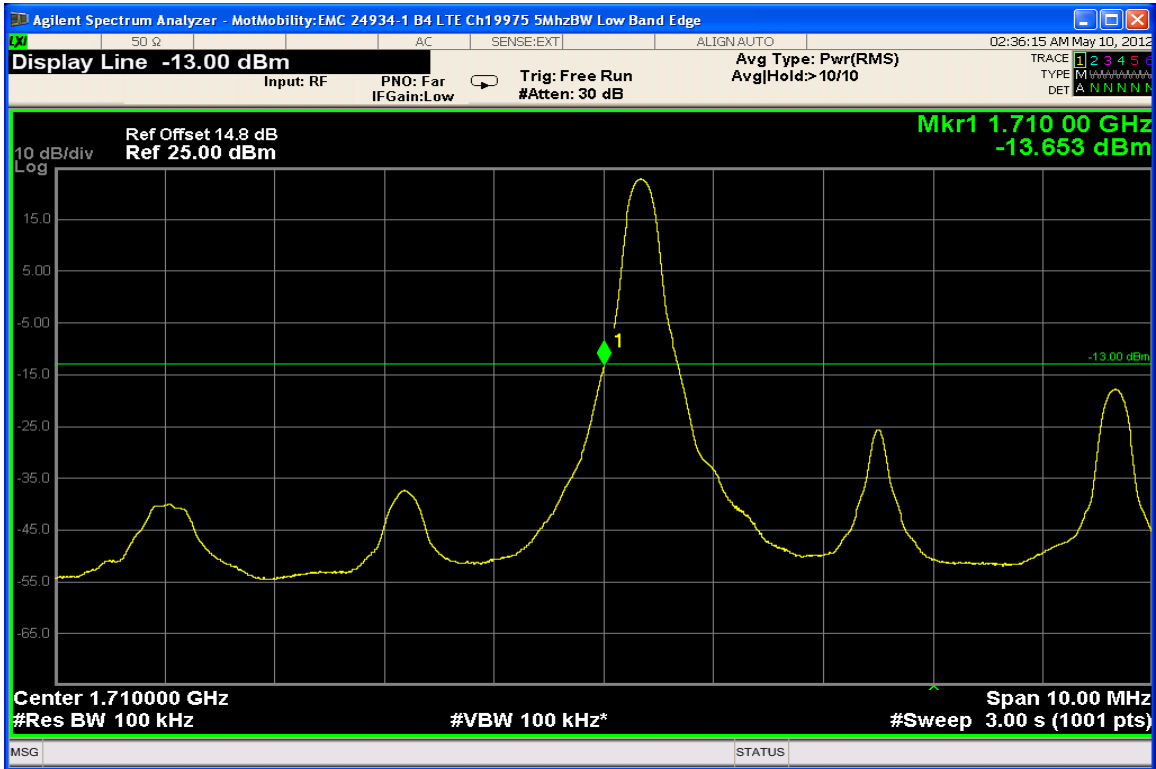
(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

The EUT was tested under all configurations and modulations with the worst cases reported in the plots below.

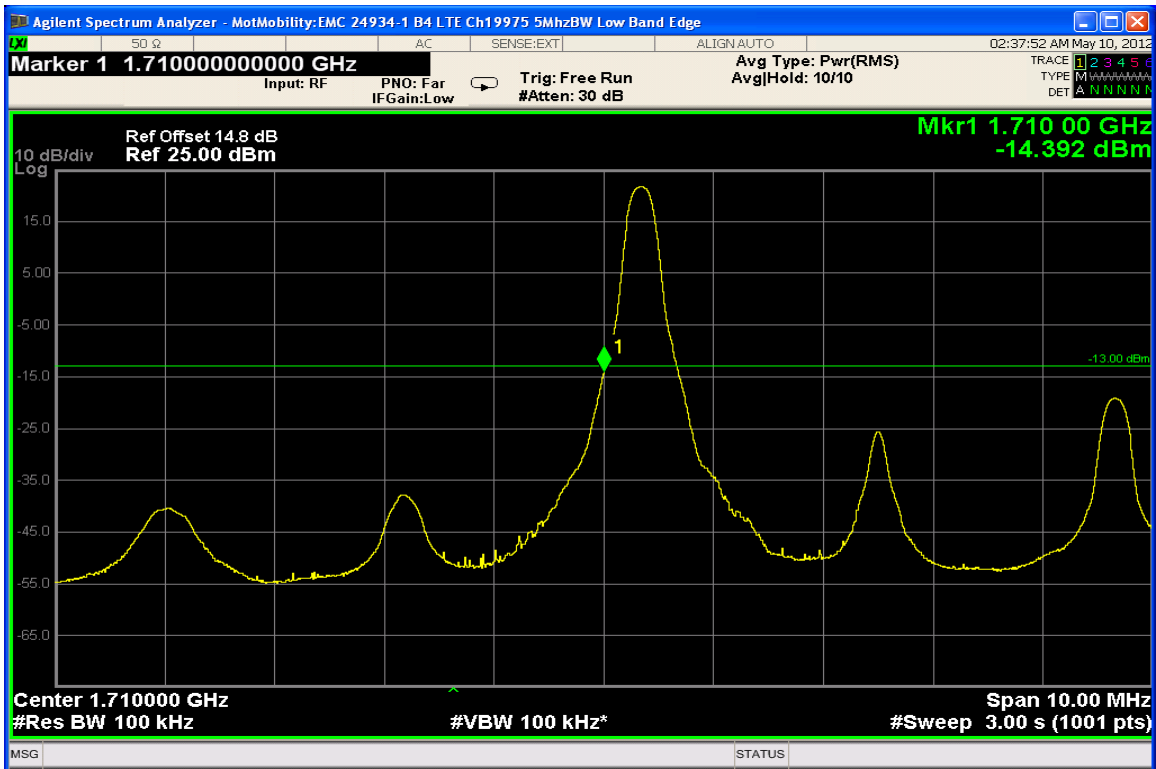
Measurement Results

Attached

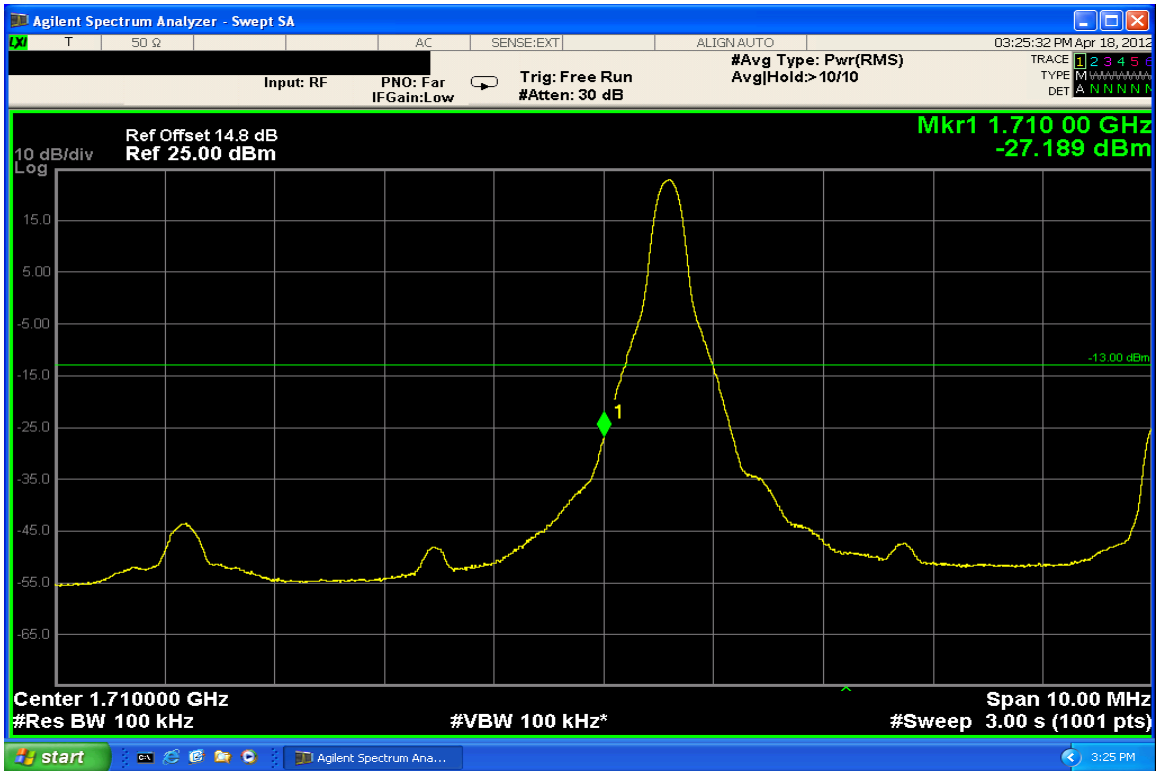
Measurement Results: Band 4 Low Band Edge



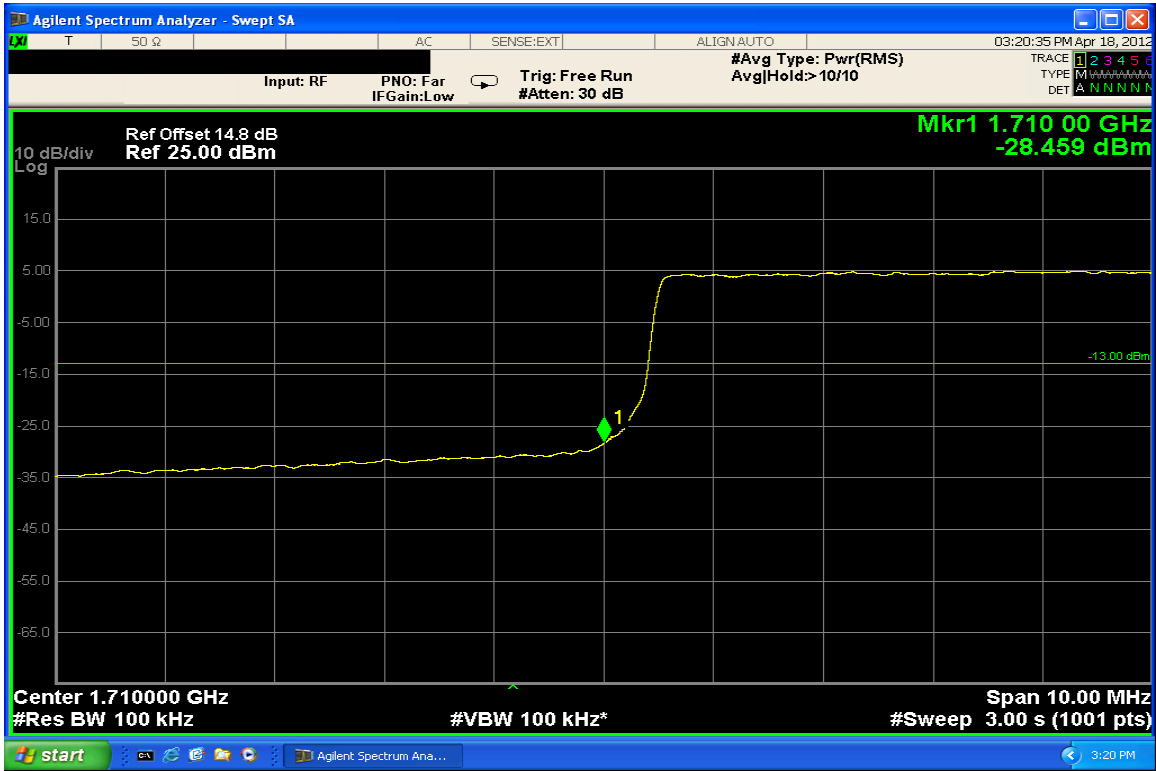
Band 4 LTE - 5MHz BW, QPSK RB Size = 1RB Start 0



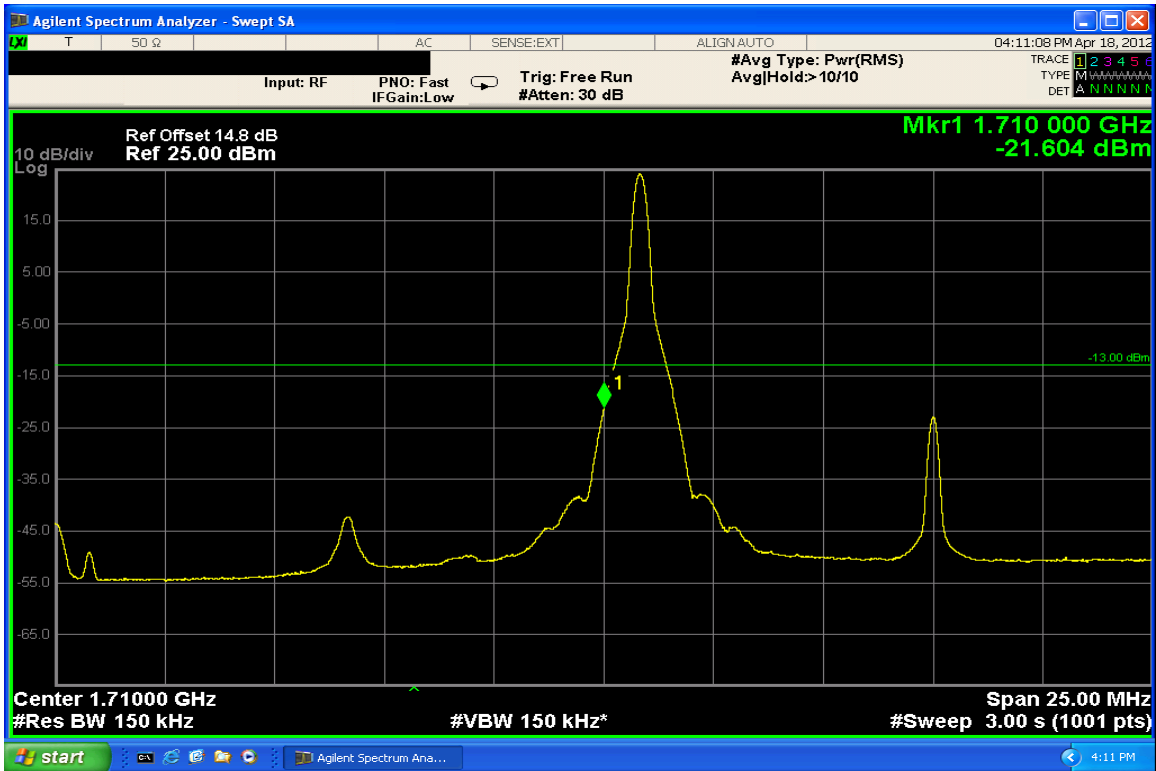
Band 4 LTE - 5MHz BW, 16QAM RB Size = 1RB Start 0



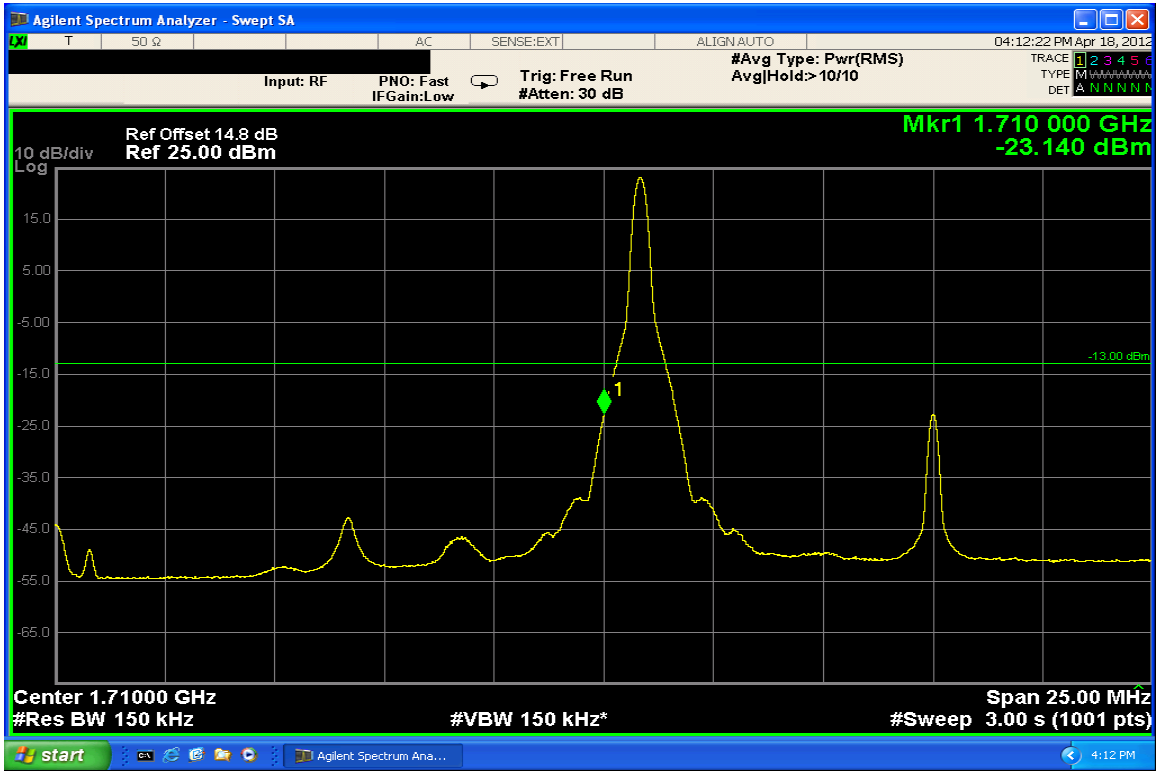
Band 4 LTE - 10MHz BW, QPSK RB Size = 1RB Start 0



Band 4 LTE - 10MHz BW, 16QAM RB Size = 50RB Start 0

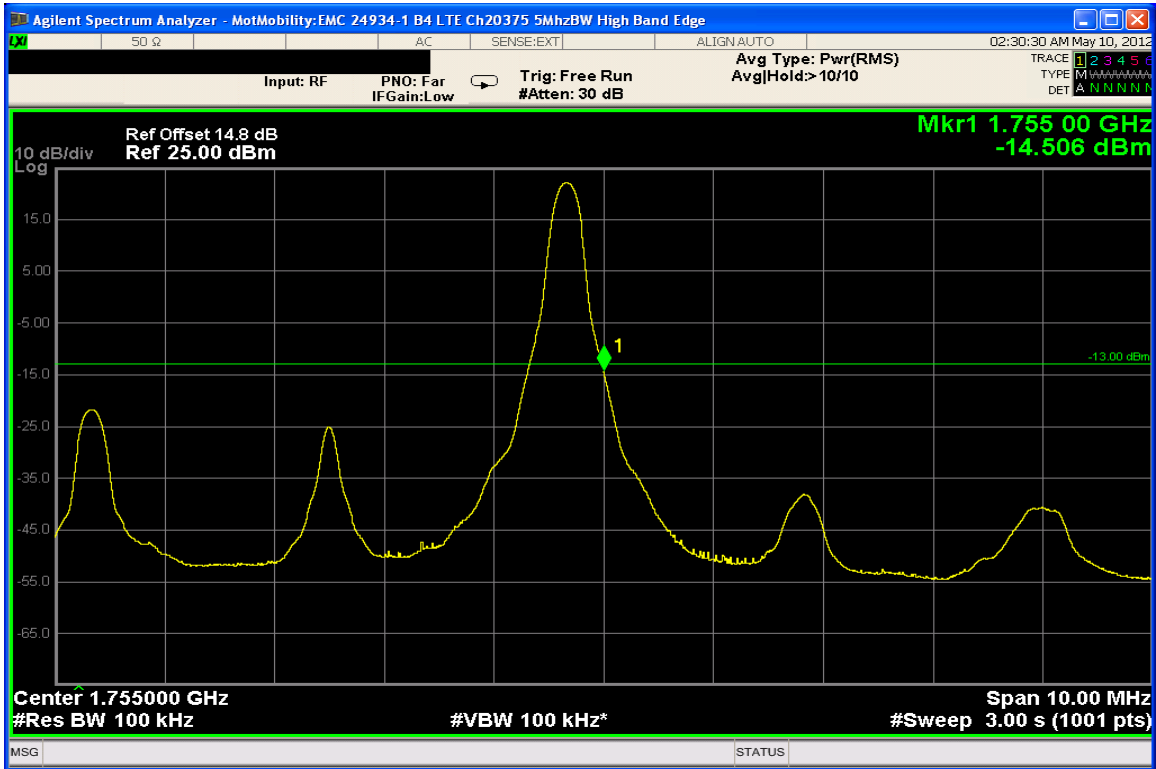


Band 4 LTE - 15MHz BW, QPSK RB Size = 1RB Start 0

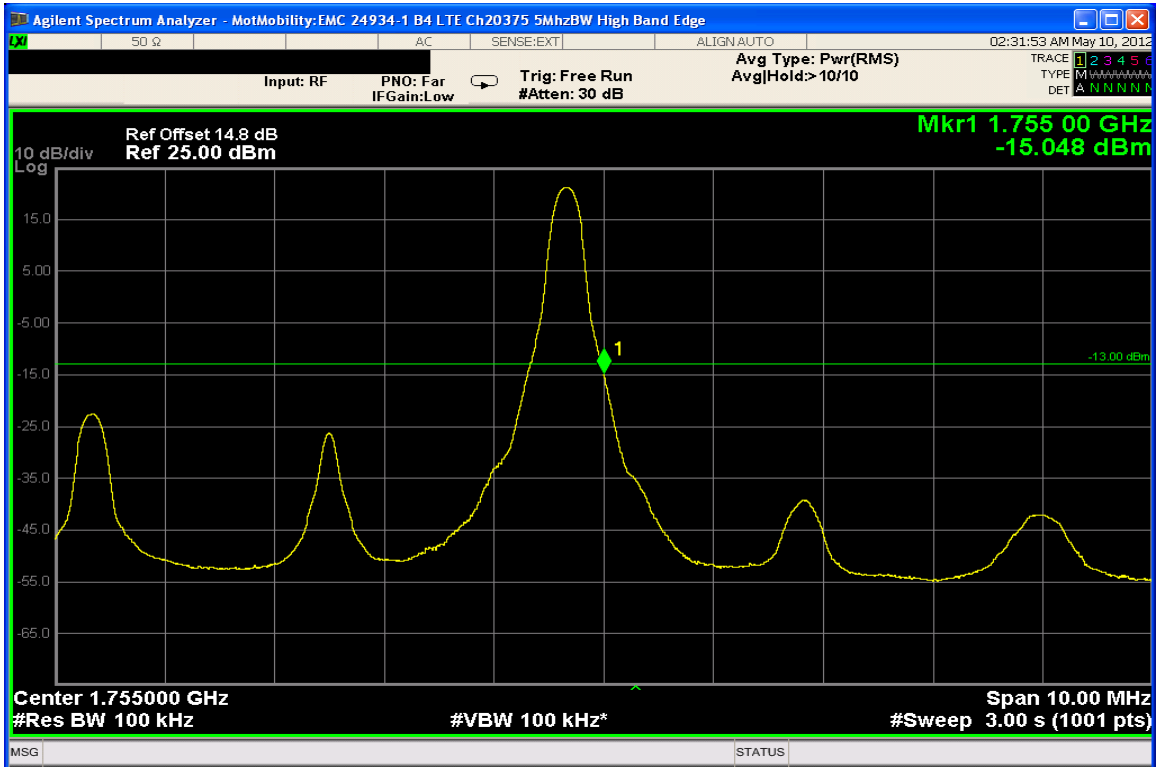


Band 4 LTE - 15MHz BW, 16QAM RB Size = 1RB Start 0

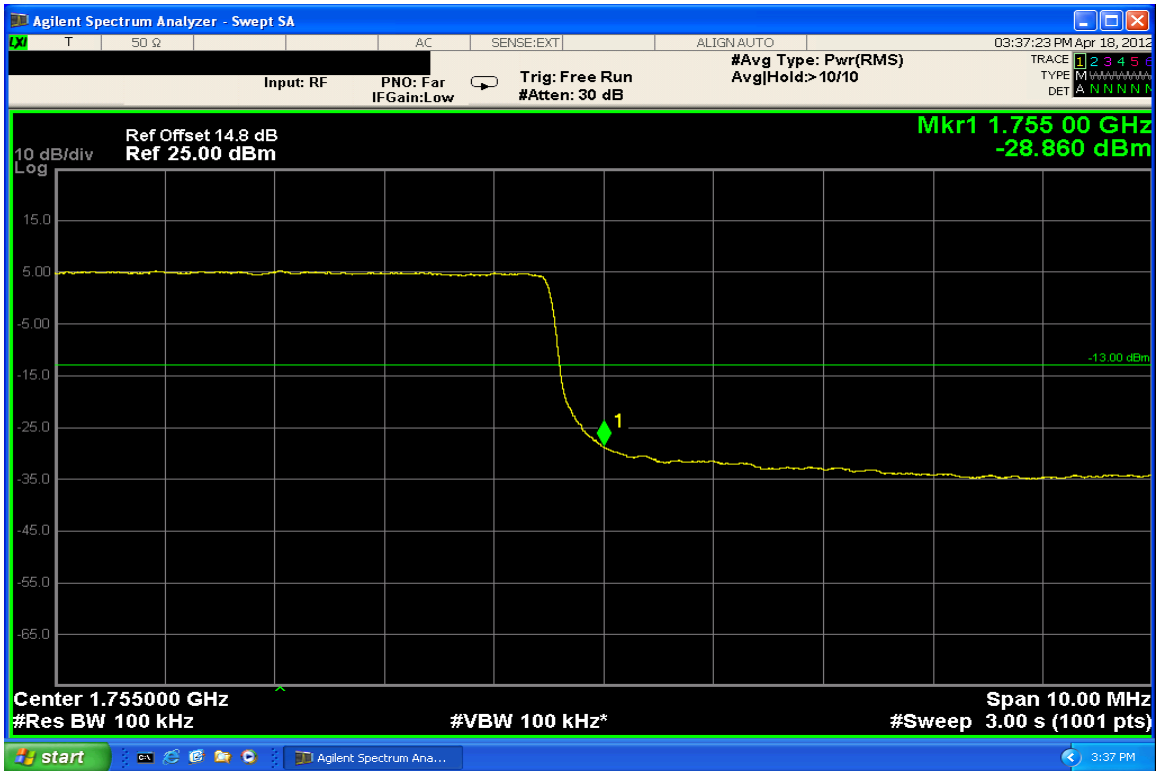
Measurement Results: LTE Band 4 High Band Edge



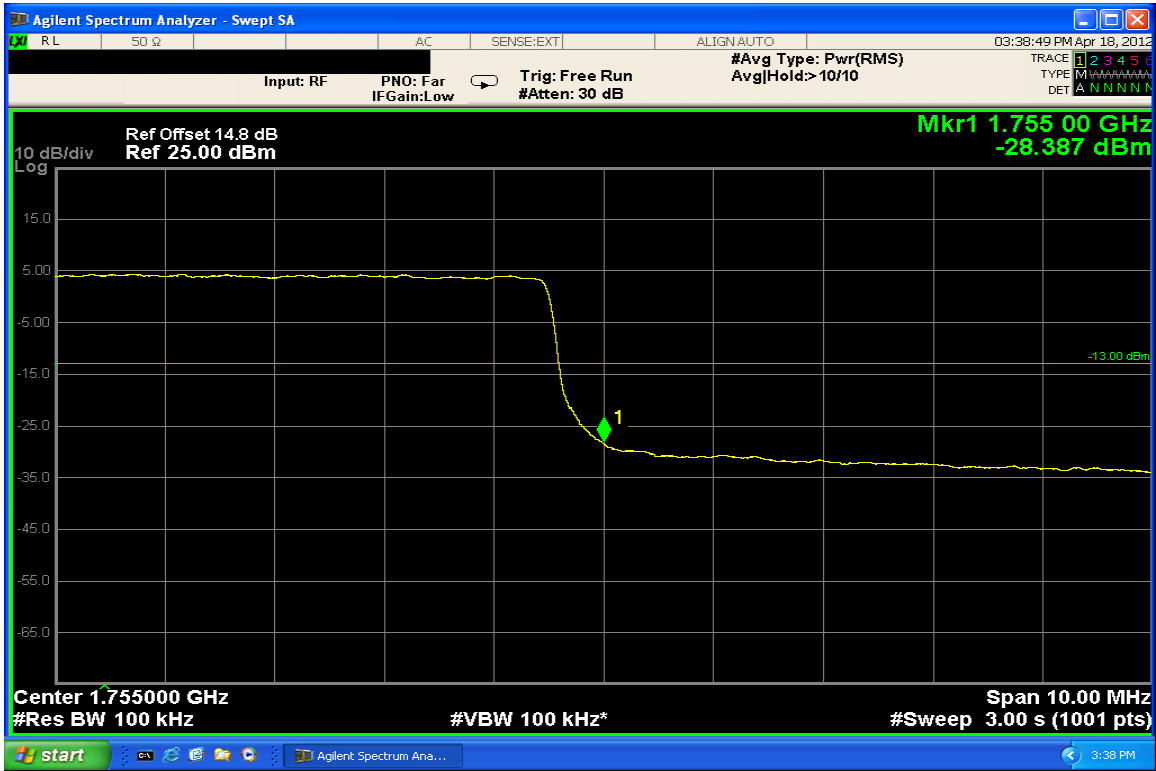
Band 4 LTE - 5MHz BW, QPSK RB Size = 1RB Start 24



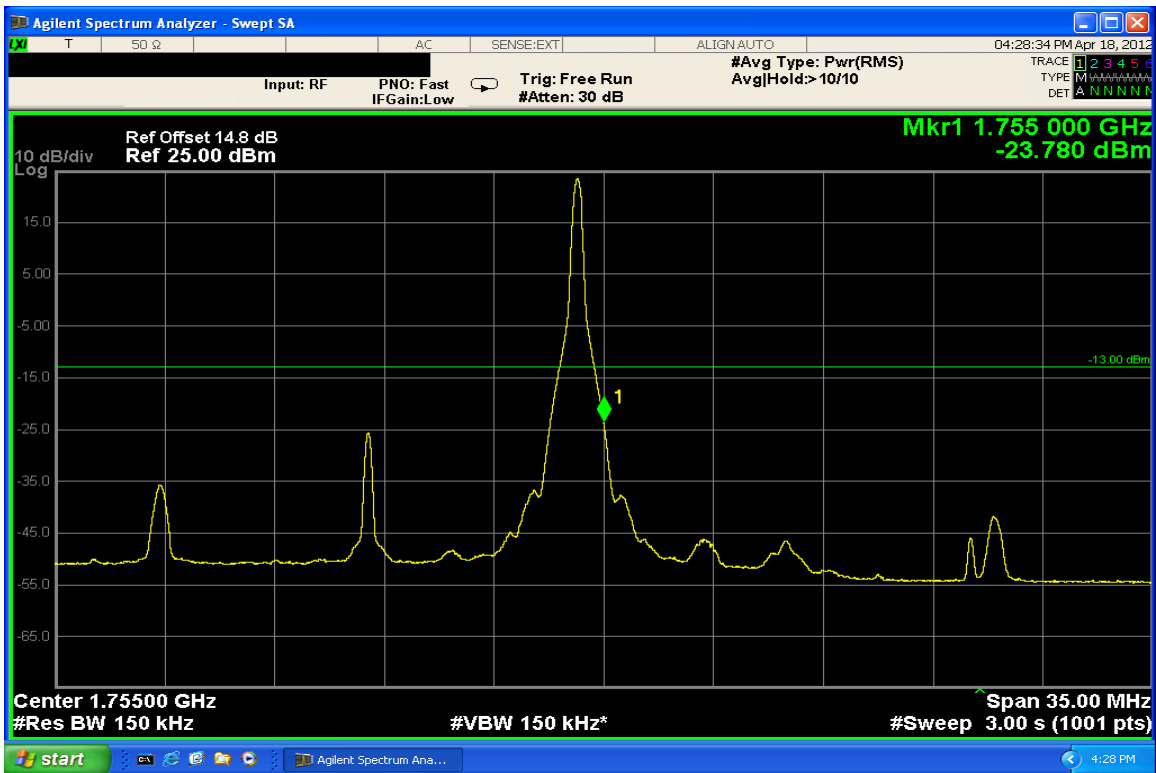
Band 4 LTE - 5MHz BW, 16QAM RB Size = 1RB Start 24



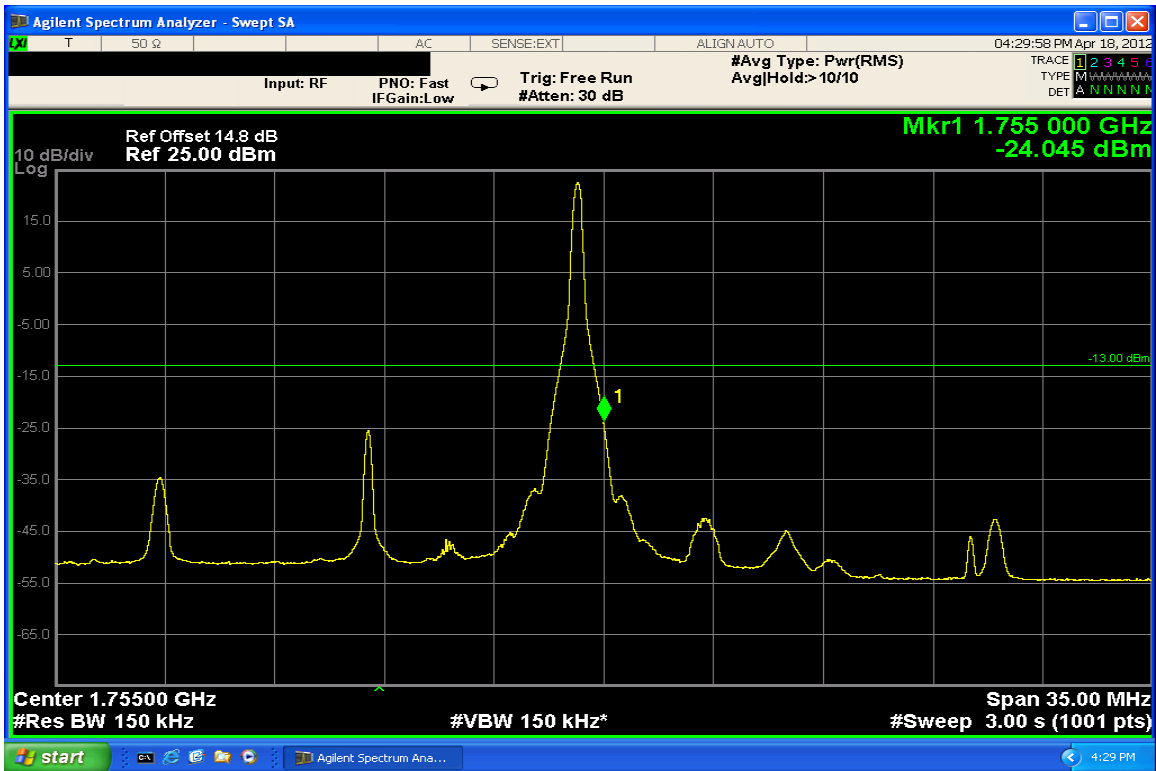
Band 4 LTE - 10MHz BW, QPSK RB Size = 50RB Start 0



Band 4 LTE - 10MHz BW, 16QAM RB Size = 50RB Start 0

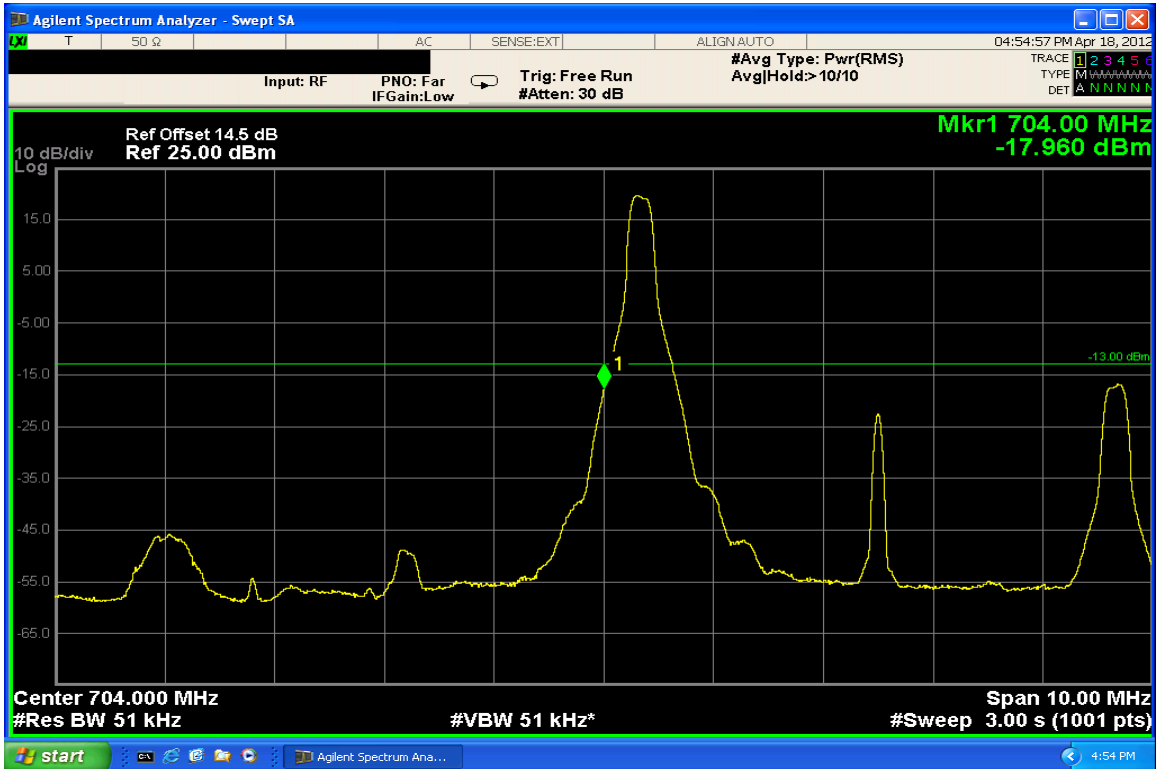


Band 4 LTE - 15MHz BW, QPSK RB Size = 1RB Start 74

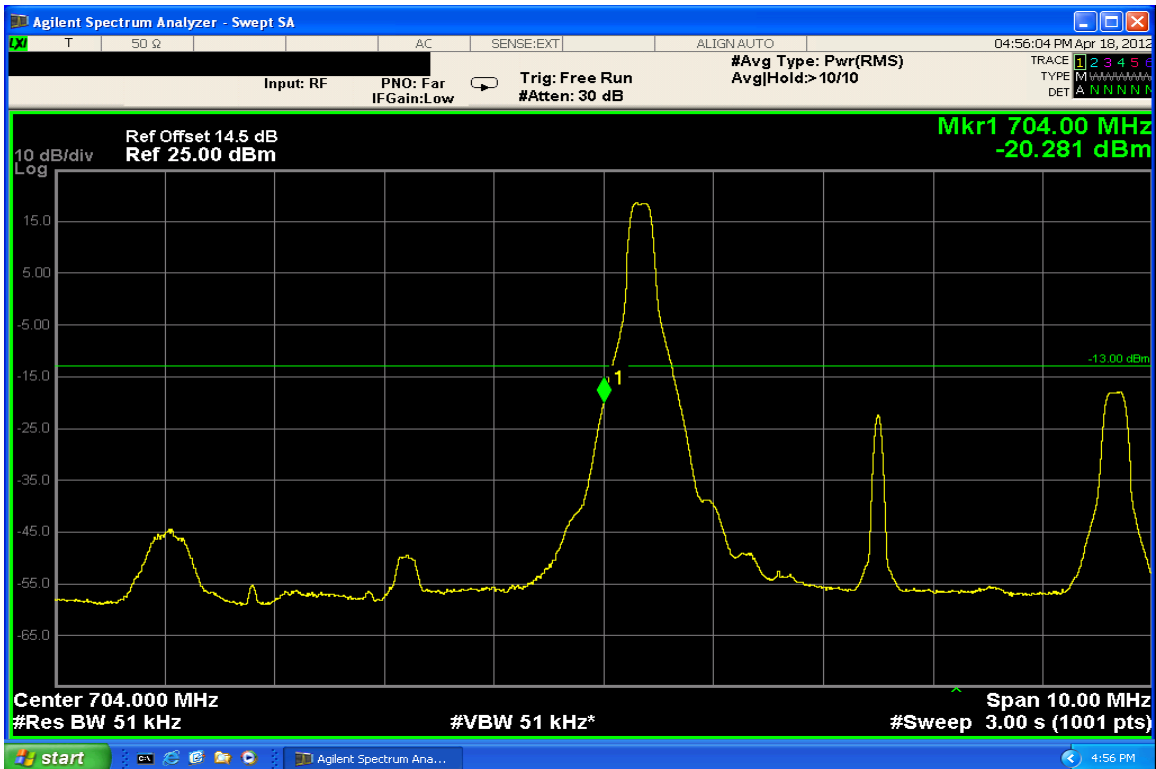


Band 4 LTE - 15MHz BW, 16QAM RB Size = 1RB Start 74

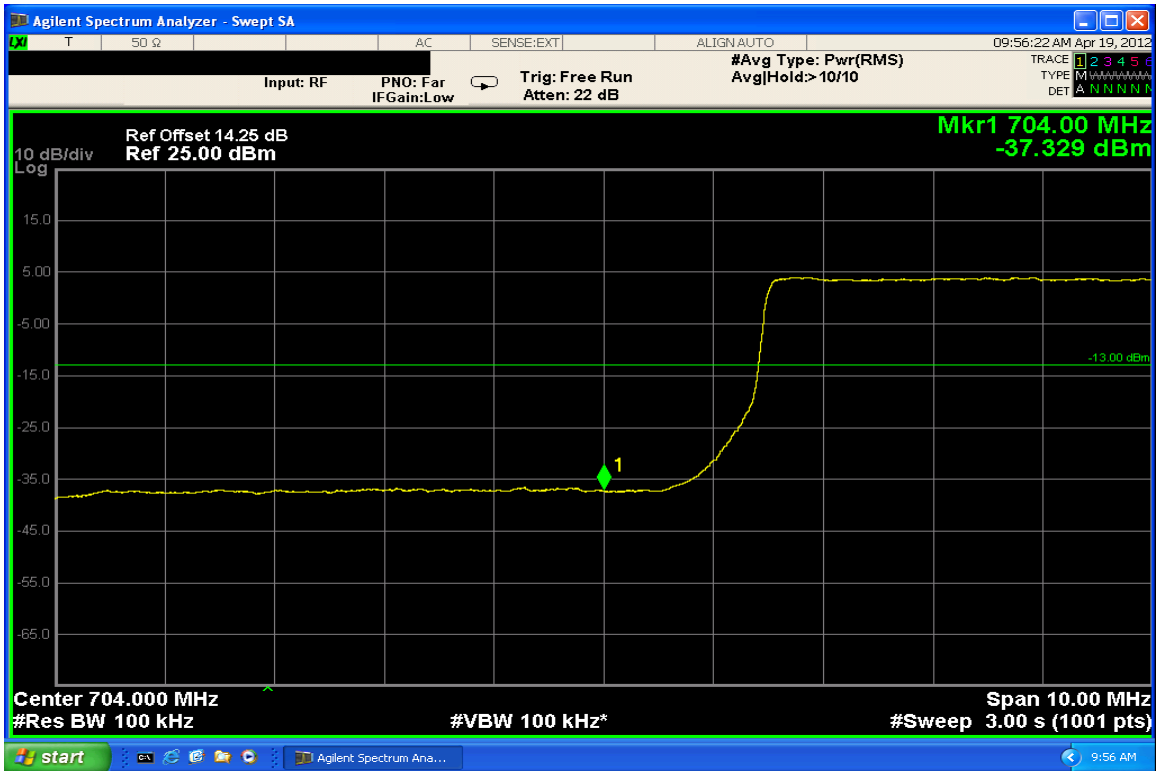
Measurement Results: Band 17 Low Band Edge



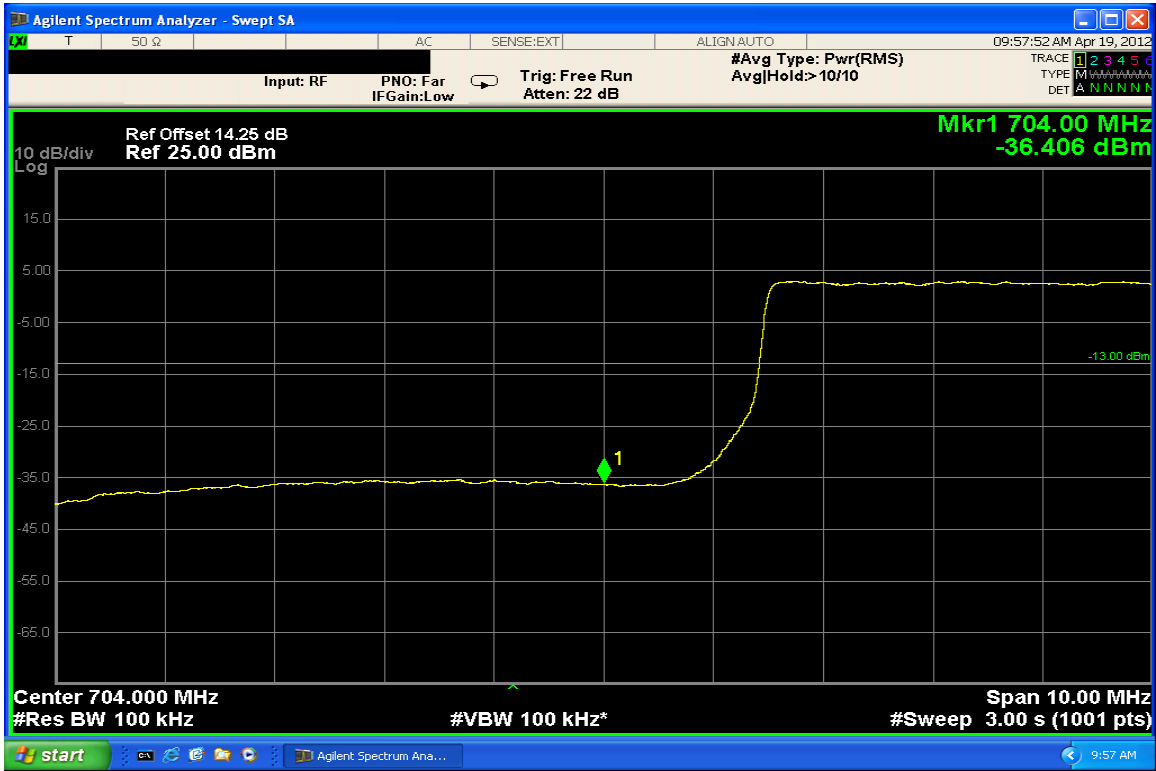
Band 17 LTE - 5MHz BW, QPSK RB Size = 1RB Start 0



Band 17 LTE - 5MHz BW, 16QAM RB Size = 1RB Start 0

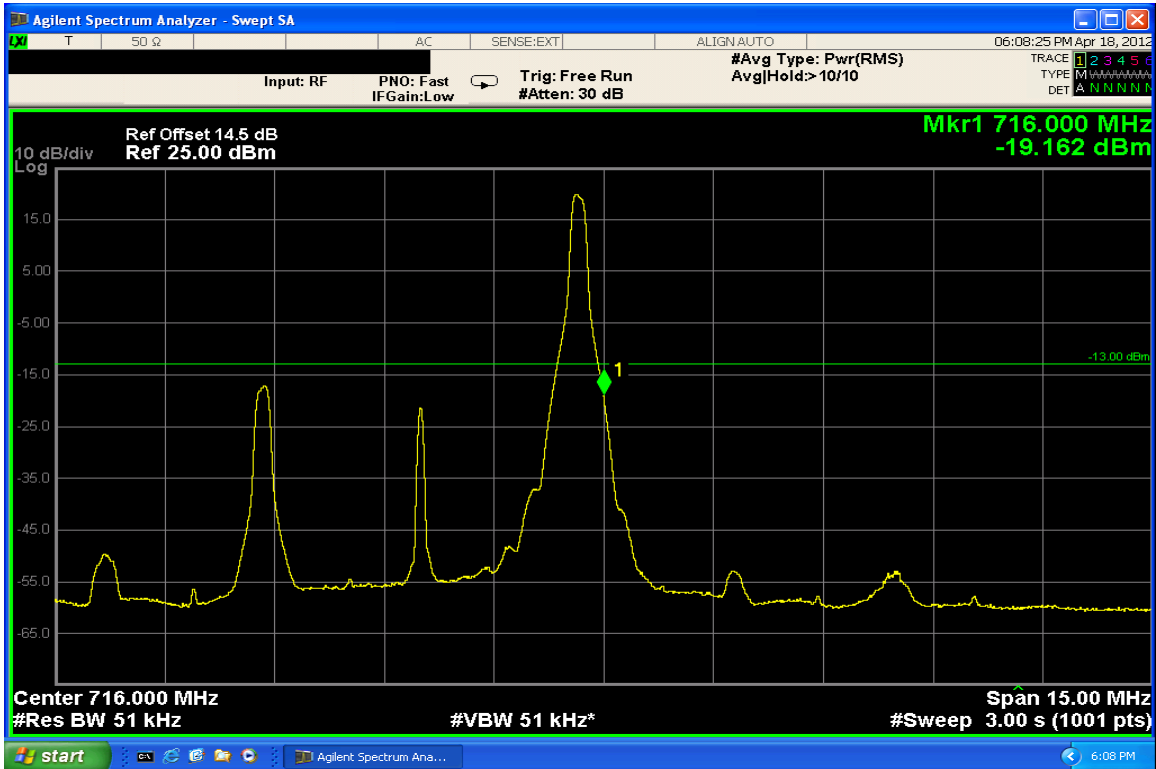


Band 17 LTE - 10MHz BW, QPSK RB Size = 50RB Start 0

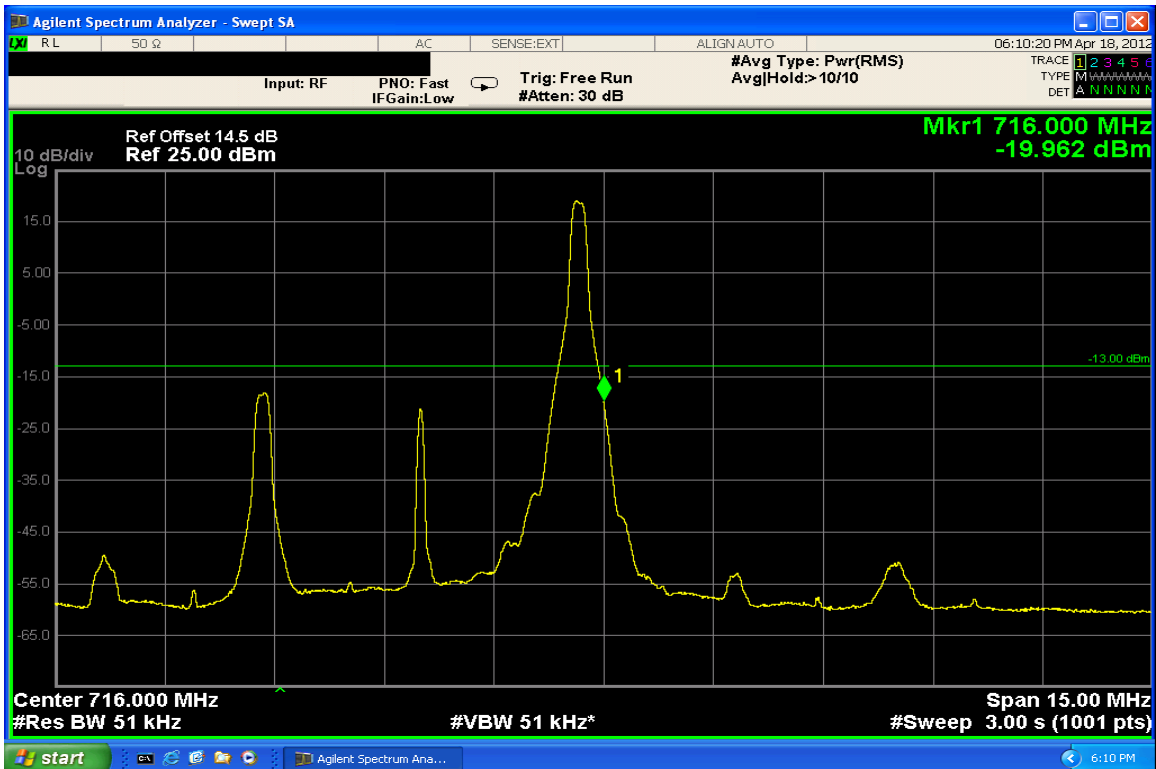


Band 17 LTE - 10MHz BW, 16QAM RB Size = 50RB Start 0

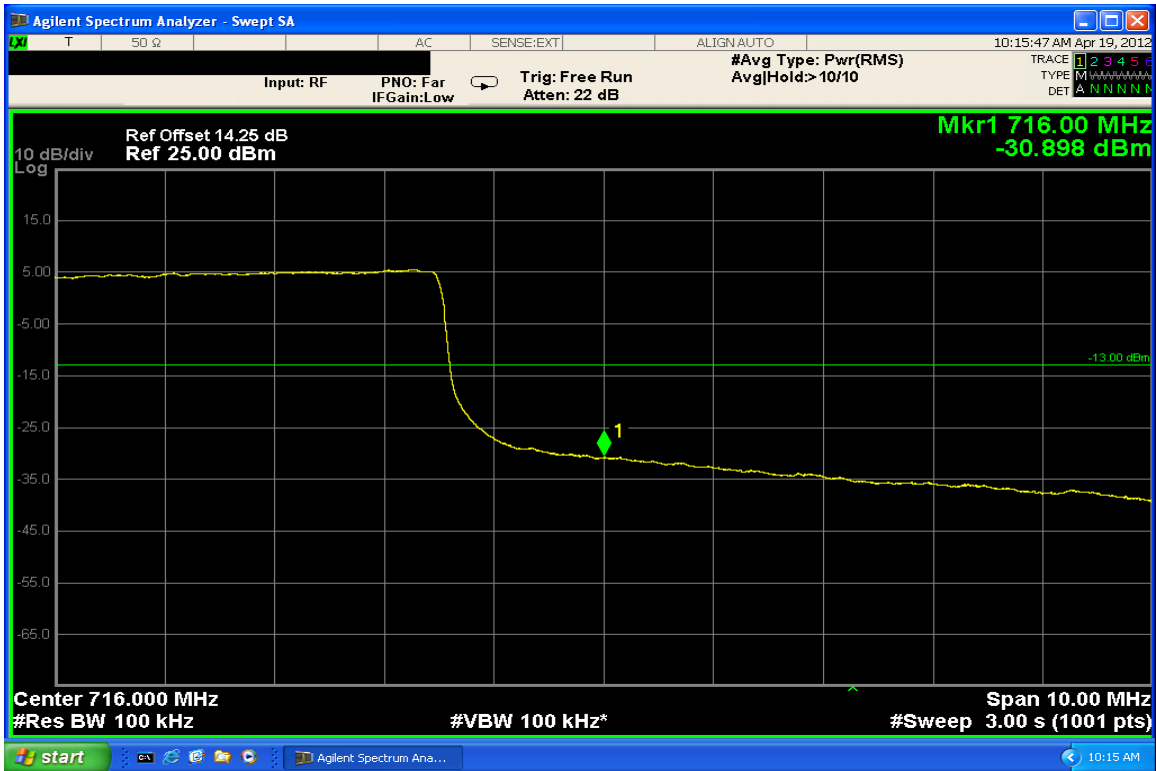
Measurement Results: Band 17 High Band Edge



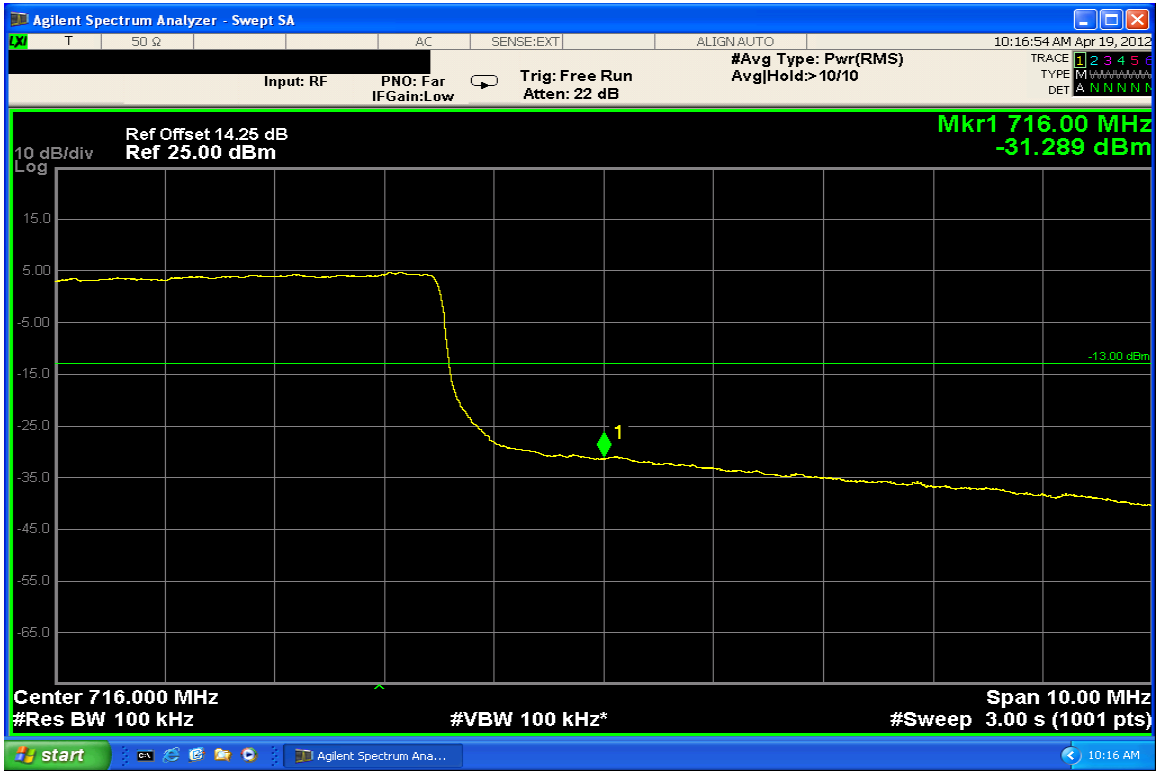
Band 17 LTE - 5MHz BW, QPSK RB Size = 1RB Start 24



Band 17 LTE - 5MHz BW, 16QAM RB Size = 1RB Start 24



Band 17 LTE - 10MHz BW, QPSK RB Size = 50RB Start 0



Band 17 LTE - 10MHz BW, 16QAM RB Size = 50RB Start 0

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

§27.53 (g), §27.53 (h)

Measurement Procedure

The RF output port of the EUT is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The fully charged internal battery was used for the supply voltage.

The spectrum was investigated from the lowest frequency signal generated, without going below 9 kHz, up to at least the tenth harmonic of the fundamental or 40 GHz, whichever is lower.

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

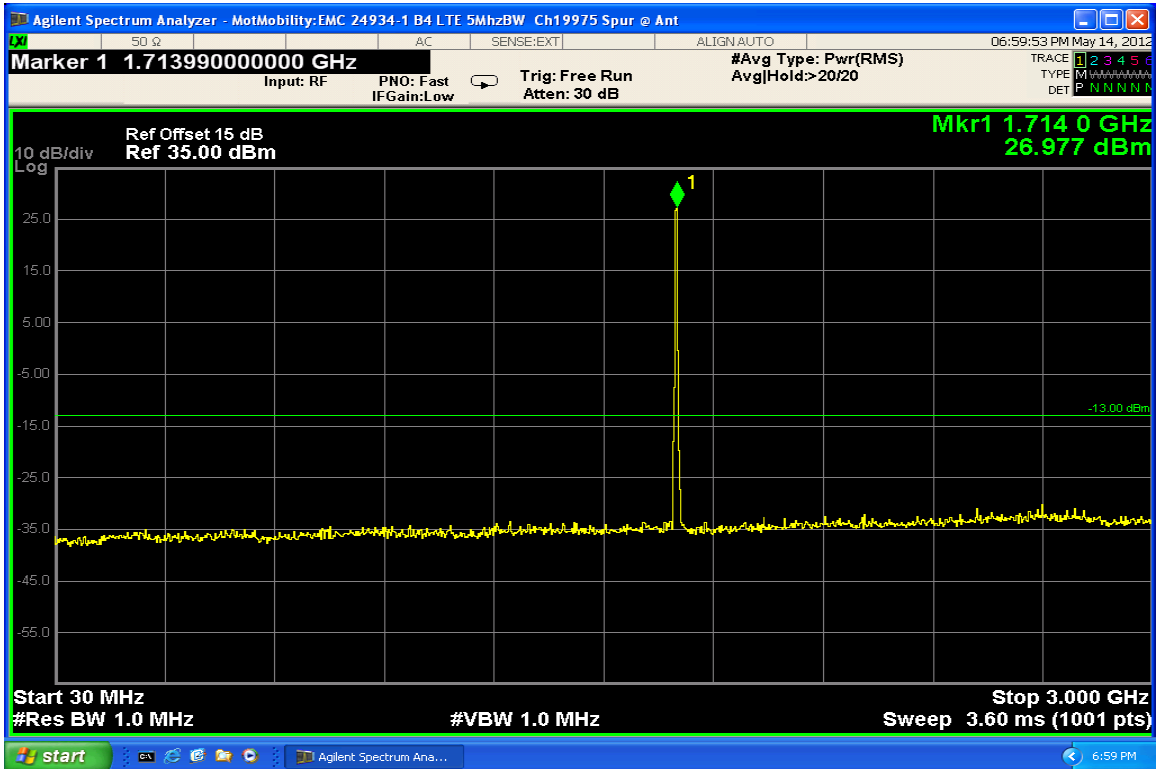
The limit line was set at -13 dBm for Band 4 and Band 17

The spectrum analyzer settings were as follows:

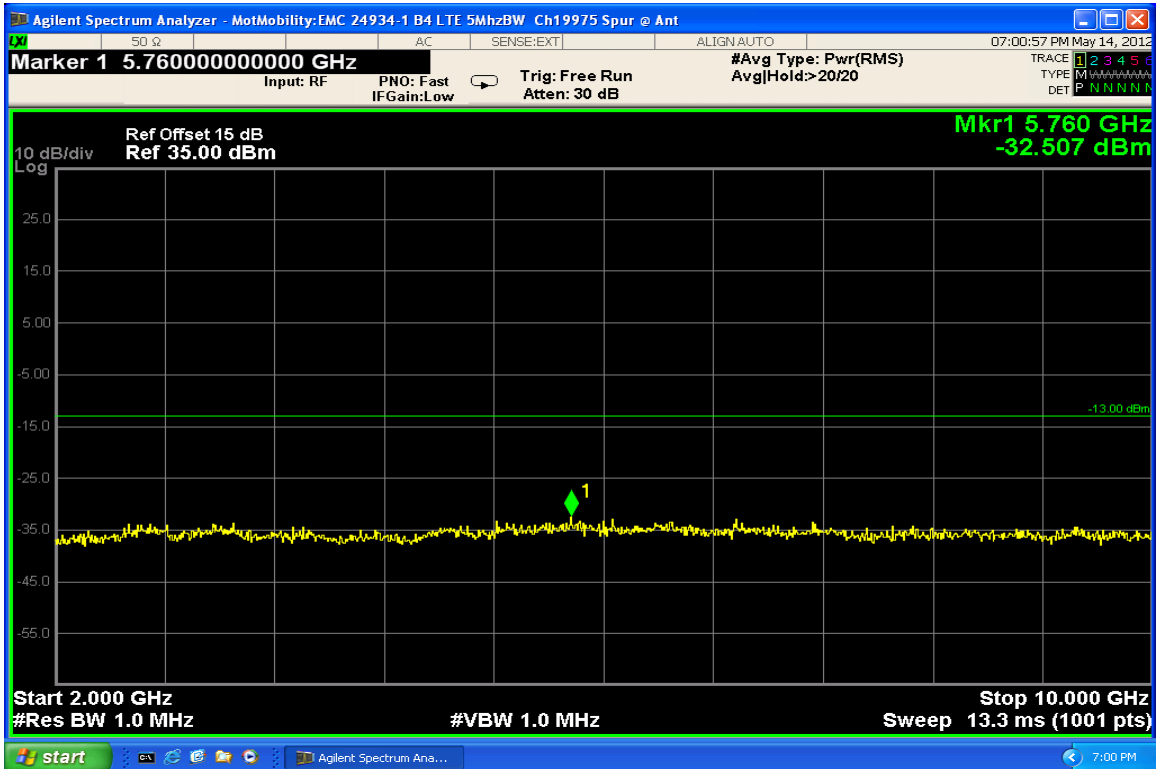
Units	dBm
Divisions	10 dB
Detector	Peak Detector
Resolution Bandwidth	1MHz for Band 4; 100kHz for Band 17
Video Bandwidth (AVG)	Auto
Sweep Time	Auto

The EUT was tested under all configurations and modulations with the worst cases reported in the plots below.

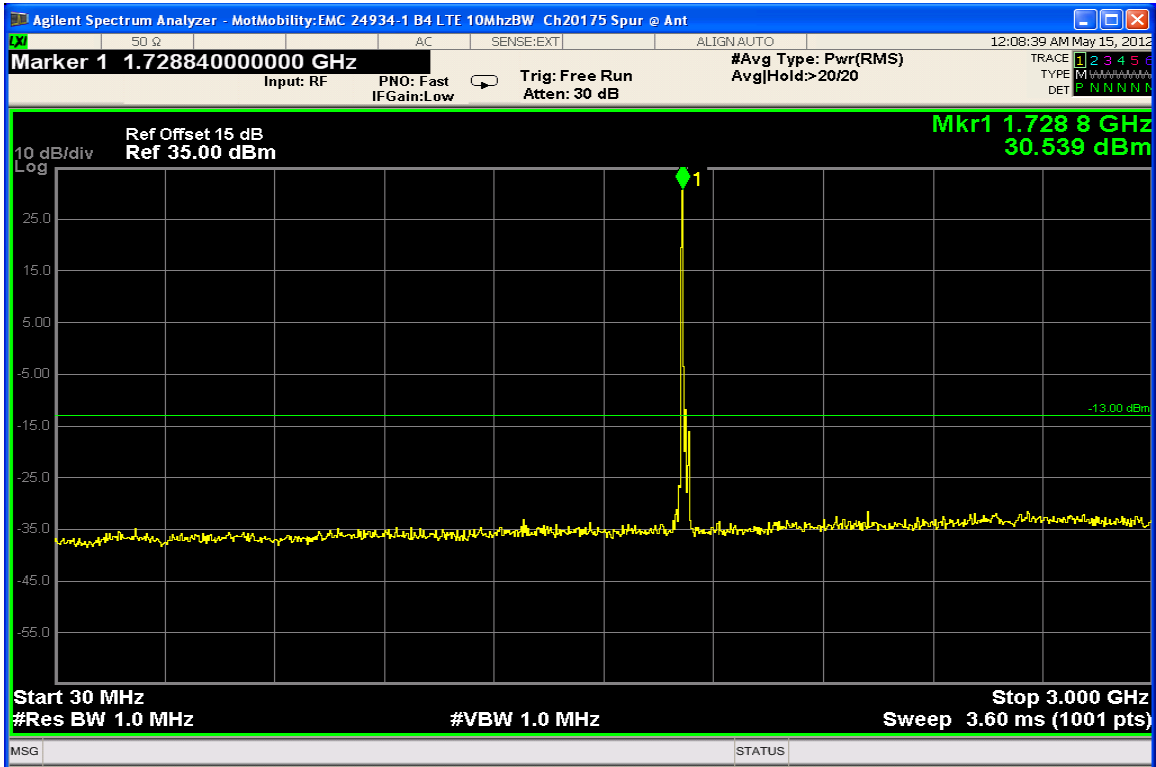
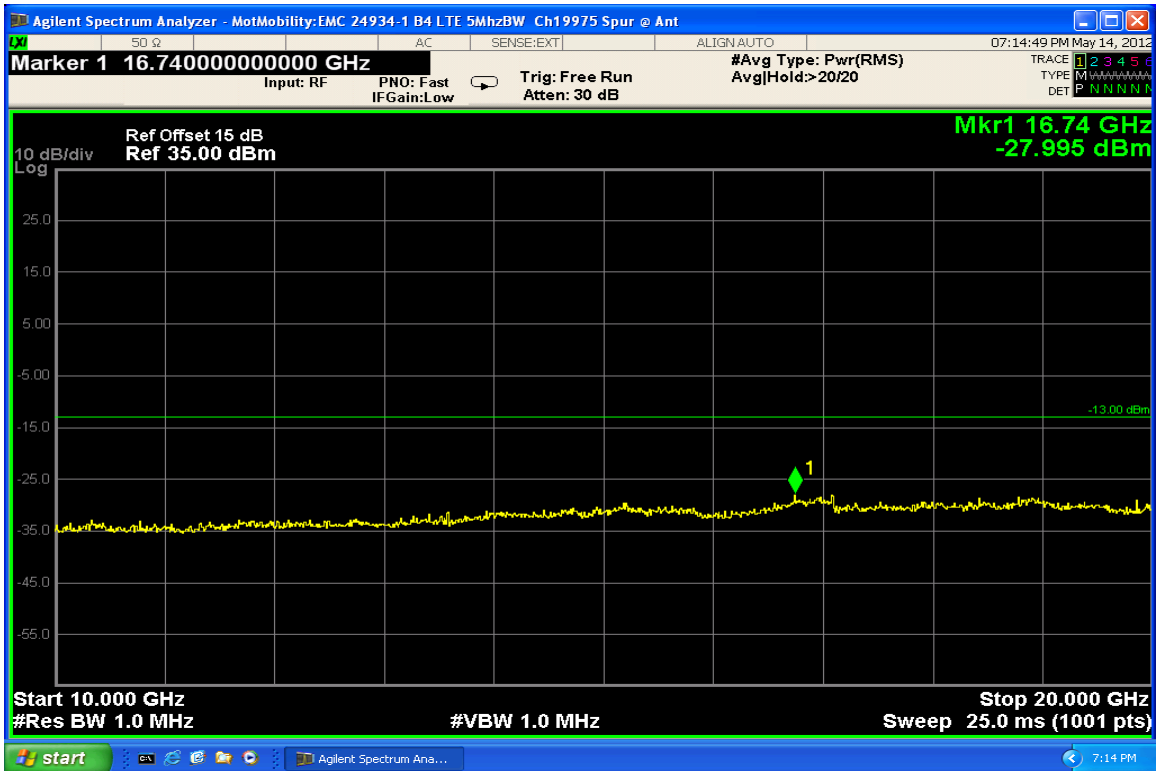
Measurement Results: LTE Band 4 Conducted Spurious Emissions

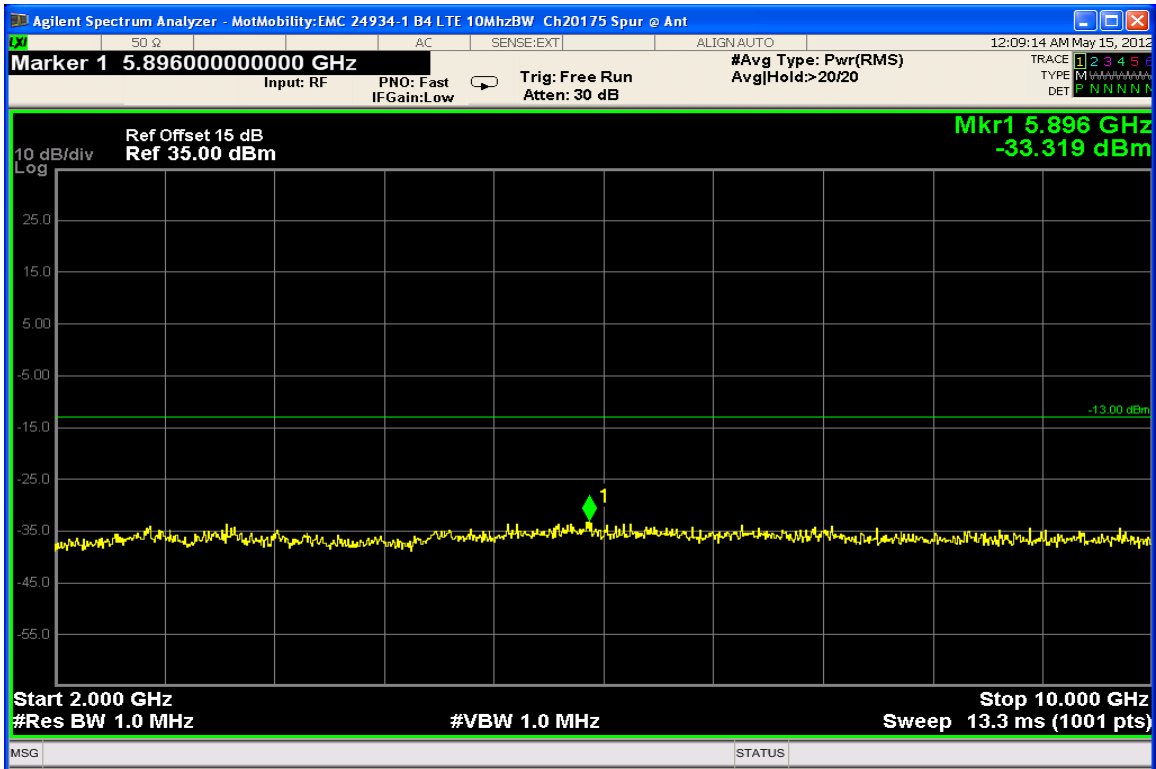


5MHz BW, 16QAM RB Size = 12RB Start 6, Low Channel

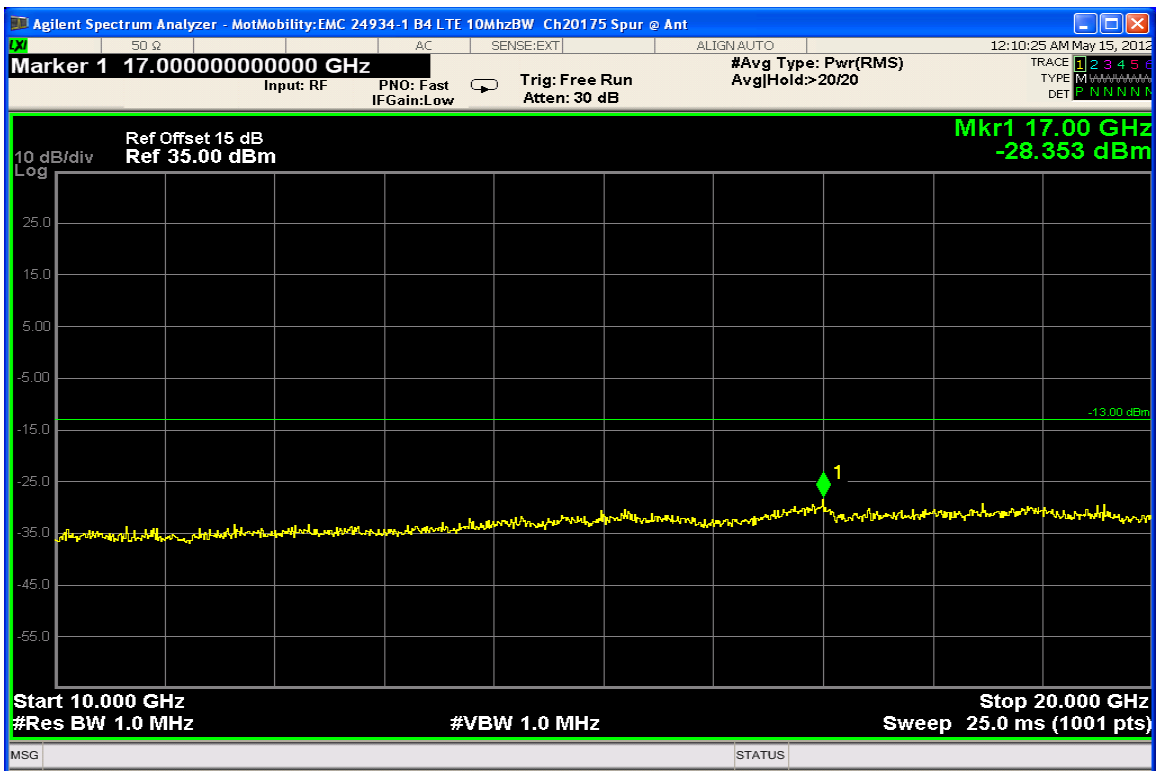


5MHz BW, 16QAM RB Size = 12RB Start 6, Low Channel

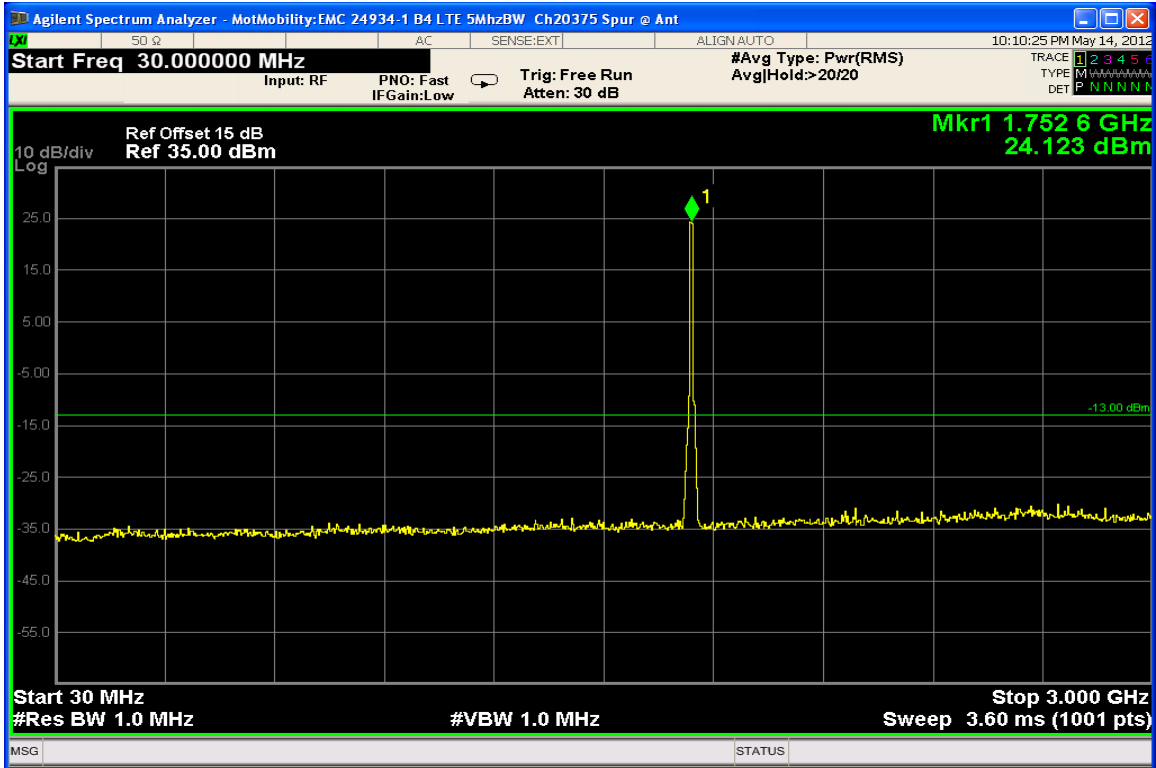




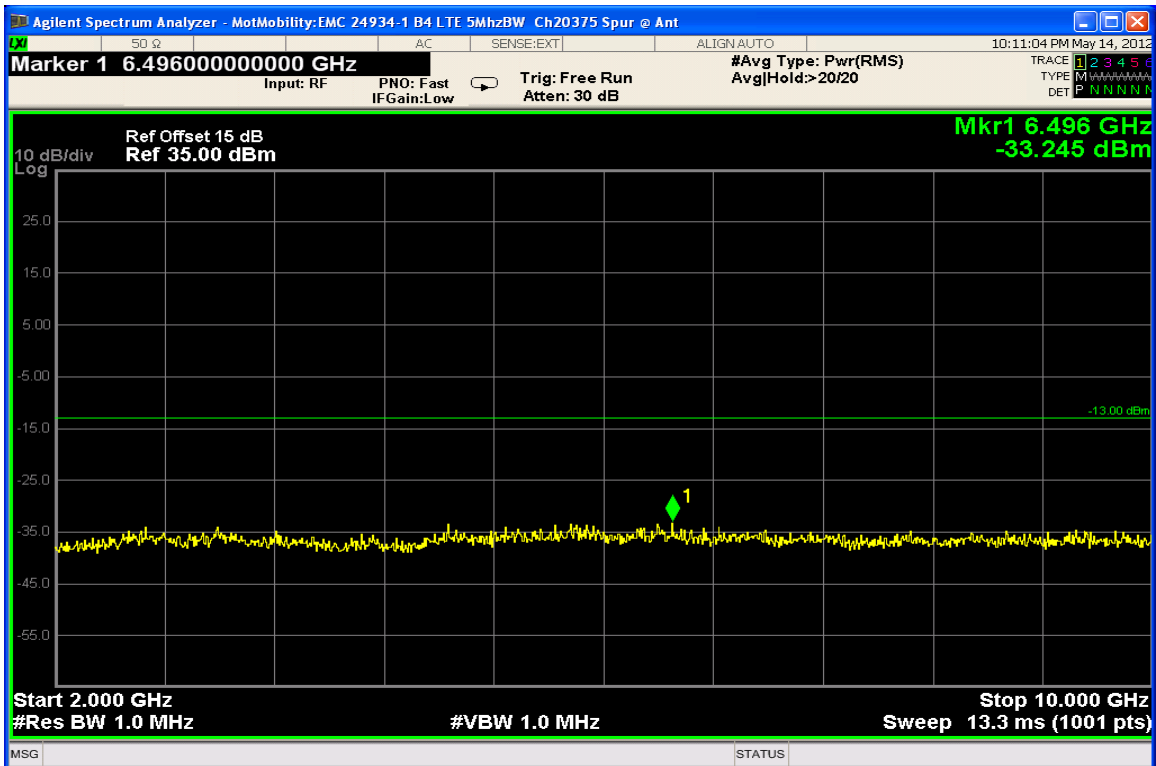
10MHz BW, 16QAM RB Size = 1RB Start 0, Mid Channel



10MHz BW, 16QAM RB Size = 1RB Start 0, Mid Channel



5MHz BW, QPSK RB Size = 25RB Start 0, High Channel

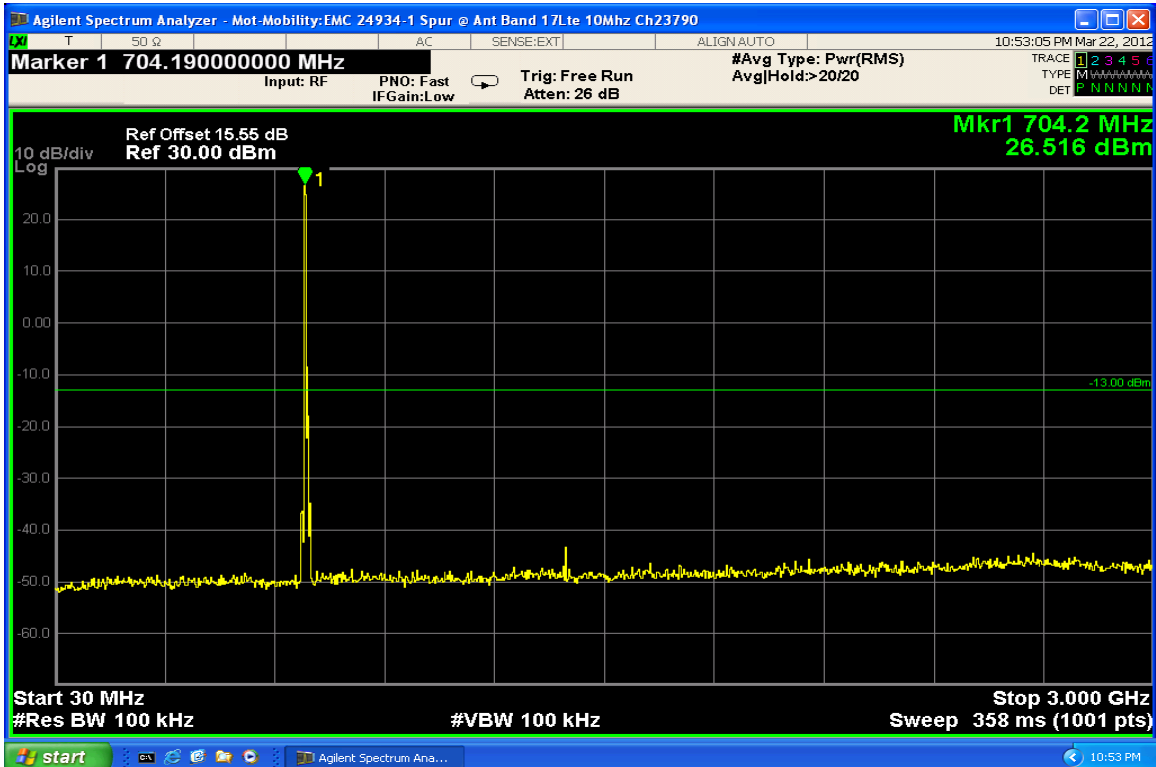


5MHz BW, QPSK RB Size = 25RB Start 0, High Channel

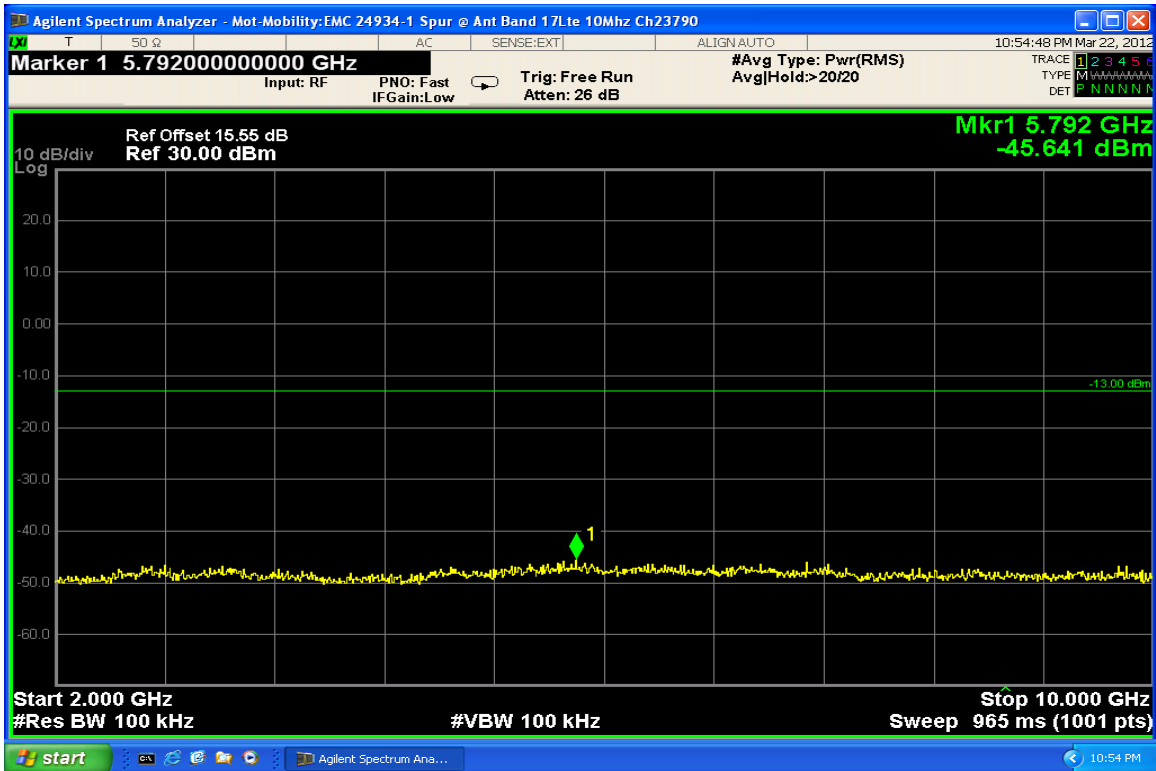


5MHz BW, QPSK RB Size = 25RB Start 0, High Channel

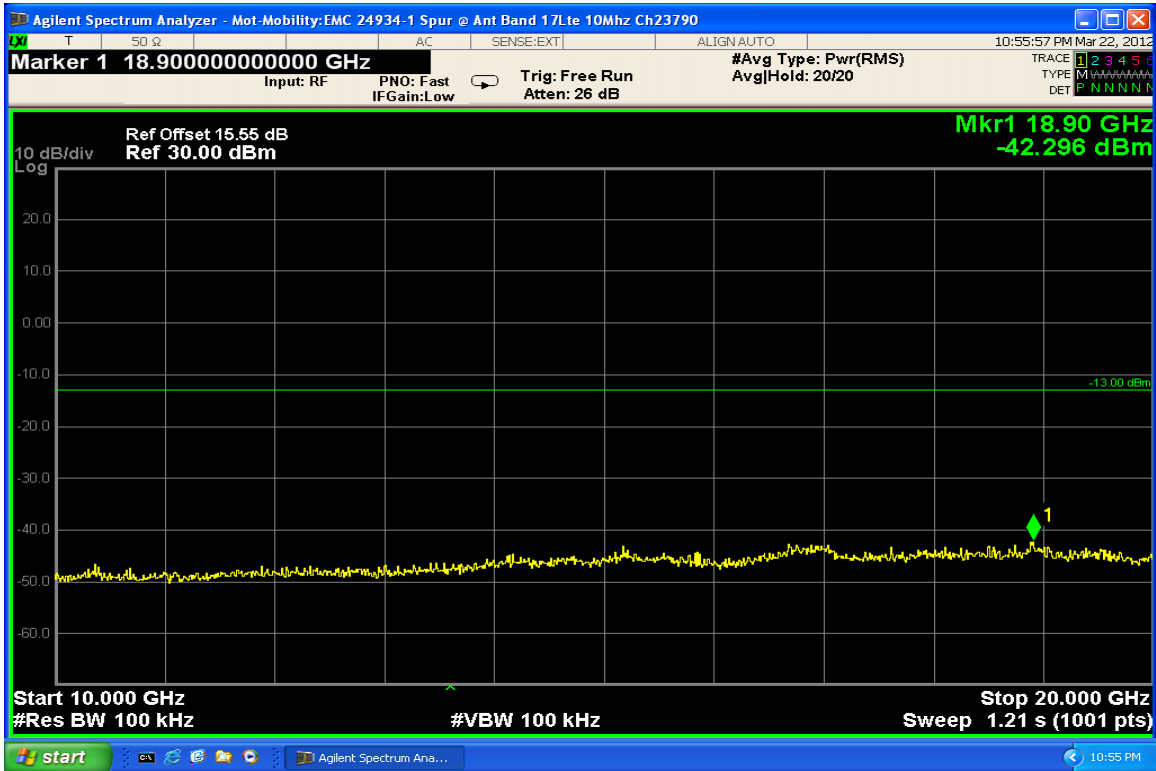
Measurement Results: LTE Band 17 Conducted Spurious Emissions



10MHz BW, QPSK RB Size = 1 RB Start 0, Mid Channel



10MHz BW, QPSK RB Size = 1 RB Start 0, Mid Channel



10MHz BW, QPSK RB Size = 1 RB Start 0, Mid Channel

FIELD STRENGTH OF SPURIOUS EMISSIONS

§27.53 (g), §27.53 (h)

Measurement Procedure

The EUT is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The EUT is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. A fully charged battery was used for the supply voltage. Testing was performed in three orthogonal planes where the X plane is with the EUT orientated vertically, the Y plane is with the EUT orientated on its side and the Z plane with the EUT laying flat on the table. The worst case emission is reported for each tested mode.

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB.

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

The settings of the receiver were as follows:

Units	dBm
Divisions	5 dB
Detector	Peak Detector
Resolution Bandwidth	1 MHz
Video Bandwidth (AVG)	Auto
Sweep Time	Auto

The EUT was tested under all configurations and modulations with the worst cases reported in the plots below.

Measurement Results

Band: LTE Band 4 and LTE Band 17.

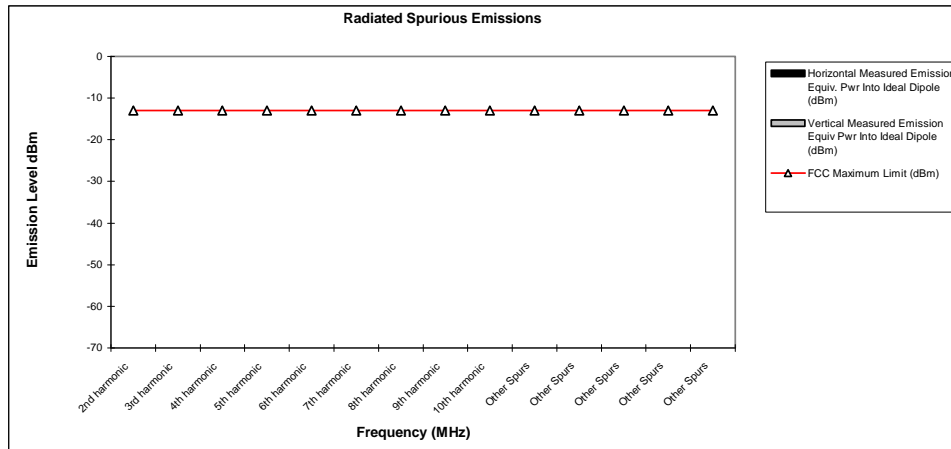
Modulation: QPSK and 16 QAM.

RB configuration: All RB configurations

Channel: All Channels

Radiated Spurious and Harmonic Emissions

Frequency (MHz)	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm)
2nd harmonic	-13	*	*
3rd harmonic	-13	*	*
4th harmonic	-13	*	*
5th harmonic	-13	*	*
6th harmonic	-13	*	*
7th harmonic	-13	*	*
8th harmonic	-13	*	*
9th harmonic	-13	*	*
10th harmonic	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*
Other Spurs	-13	*	*



Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

FREQUENCY STABILITY

§Part 27.54

Measurement Procedure

The EUT is placed in an environmental chamber. The antenna port of the EUT is directly coupled to the input of the measurement equipment through a specialized RF connector. A power supply is attached as the primary voltage supply.

Frequency measurements are made at the extremes of the temperature range -30° C to +60° C and at intervals of 10° C with the primary supply voltage set to the nominal battery operating voltage. A period of time sufficient to stabilize all components of the equipment is allowed at each frequency measurement. The maximum variation of frequency is measured.

At room temperature, the primary supply voltage is reduced to the battery operating endpoint of the equipment under test. The maximum variation of frequency is measured. A power supply was used for the input supply voltage.

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

The EUT was tested in all bandwidths and modulations with the worst cases reported in the plots below.

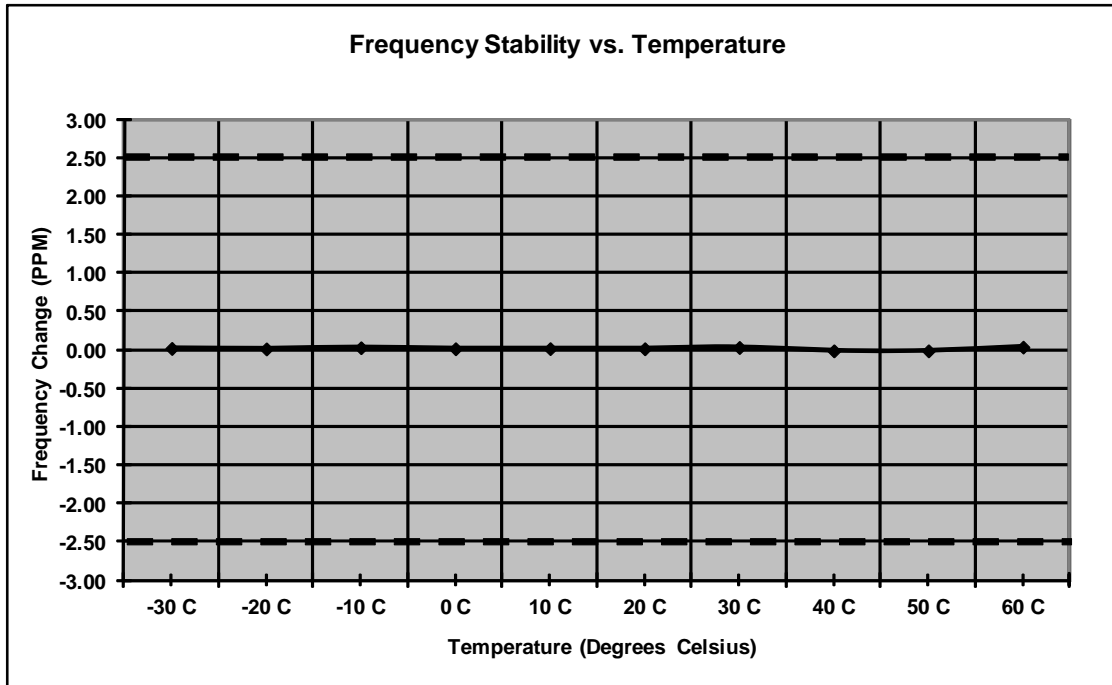
Measurement Results

Modulation: LTE Band 4 QPSK 15MHz BW

Frequency Stability

Mode: Band 4 LTE 15Mhz **Operating Frequency:** 1732.5 Mhz
Channel: 20175 **Deviation Limit (PPM):** 2.5 ppm
 75RB low QPSK

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	13.48	0.016	100%	3.80
-20 C	8.98	0.011	100%	3.80
-10 C	21.56	0.026	100%	3.80
0 C	10.30	0.012	100%	3.80
10 C	11.36	0.014	100%	3.80
20 C	10.31	0.012	100%	3.80
30 C	24.42	0.029	100%	3.80
40 C	-12.49	-0.015	100%	3.80
50 C	-12.42	-0.015	100%	3.80
60 C	27.79	0.033	100%	3.80
20 C	-21.79	-0.026	Battery Endpoint	3.42

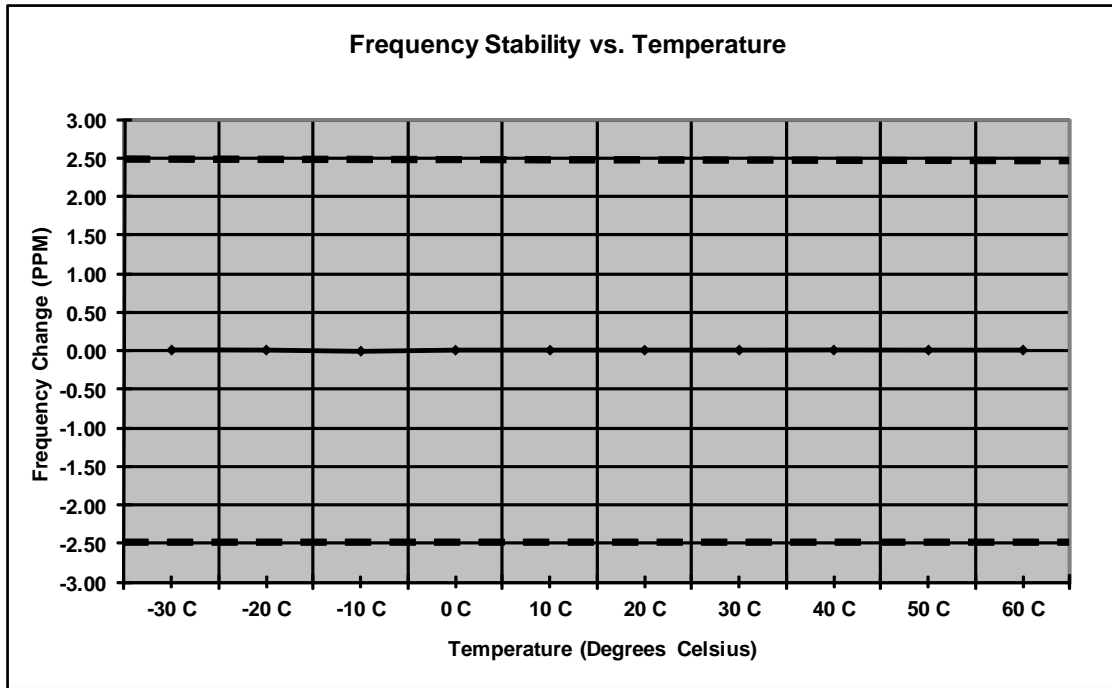


Modulation: LTE Band 17 QPSK 10MHz BW

Frequency Stability

Mode: Band 17 LTE 10Mhz **Operating Frequency:** 710.0 Mhz
Channel: 23790 **Deviation Limit (PPM):** 2.5ppm
 50RB low QPSK

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage (%)	Voltage (VDC)
-30 C	6.02	0.007	100%	3.80
-20 C	5.39	0.006	100%	3.80
-10 C	-5.44	-0.007	100%	3.80
0 C	5.29	0.006	100%	3.80
10 C	5.22	0.006	100%	3.80
20 C	5.21	0.006	100%	3.80
30 C	5.66	0.007	100%	3.80
40 C	5.74	0.007	100%	3.80
50 C	5.55	0.007	100%	3.80
60 C	5.48	0.007	100%	3.80
20 C	5.05	0.006	Battery Endpoint	3.42



End of Test Report