

**FCC TEST REPORT****For****ICG****Model: ICG-100-NA-R****Trade Name: Intwine connect***Issued to*

**Foxconn International Inc  
NO 2 ZIYOU ST TUCHENG DISTRICT  
NEW TAIPEI  
236**

*Issued by*

**Compliance Certification Services Inc.  
No.11, Wugong 6th Rd., Wugu Dist.,  
New Taipei City 24891, Taiwan. (R.O.C.)  
<http://www.ccsrf.com>  
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**Issued Date: September 2, 2015**

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**Revision History**

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		September 2, 2015		Initial Issue	ALL	Angel Cheng

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## 1. TEST RESULT CERTIFICATION

**Applicant:** Foxconn International Inc  
NO 2 ZIYOU ST TUCHENG DISTRICT  
NEW TAIPEI  
236

**Equipment Under Test:** ICG

**Trade Name:** Intwine connect

**Model:** ICG-100-NA-R

**Date of Test:** September 1, 2015

FCC PART 27, SUBPART C, L, FCC PART 2	
OPERATING BAND: 777 ~ 787 MHz	
Standard	TEST TYPE AND LIMIT
2.1046 27.50(C)(10)	Maximum Peak Output Power Limit: max. 3 watts e.r.p peak power
2.1055 27.54	Frequency Stability
2.1049 27.53(g)	Occupied Bandwidth
27.50(d)(5)	Peak to average ratio
27.53(g)	Band Edge Measurements
2.1051 27.53(g)	Conducted Spurious Emissions
2.1053 27.53(g)	Radiated Spurious Emissions

Note: 1. The test result judgment is decided by the limit of test standard  
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by



Miller Lee  
Manager  
Compliance Certification Services Inc.



Angel Cheng  
Section Manager  
Compliance Certification Services Inc.

## 2. EUT DESCRIPTION

<b>Product</b>	ICG	
<b>Model Number</b>	ICG-100-NA-R	
<b>Model Discrepancy</b>	N/A	
<b>Trade</b>	Intwine connect	
<b>Received Date</b>	July 15, 2015	
<b>Power Source</b>	Power form power adapter. DVE / Model: DSA-18PFM-12 FUS 120150 I/P:100-240V, 50-60Hz, 0.6A O/P: 12V, 1.5A	
<b>Modulation Technology</b>	LTE Band 13	QPSK, 16QAM
<b>Frequency Range</b>	LTE Band 13 Channel Bandwidth: 5MHz	779.5MHz ~ 784.5MHz
	LTE Band 13 Channel Bandwidth: 10MHz	782.0MHz
<b>Maximum ERP Power</b>	LTE Band 13 Channel Bandwidth: 5MHz	QPSK: 21.48dBm 16QAM: 21.86dBm
	LTE Band 13 Channel Bandwidth: 10MHz	QPSK : 21.31dBm 16QAM: 22.32 dBm
<b>Category</b>	3	
<b>Antenna Specification</b>	1. Taoglas / Part No.: TG.30.8113W Diople Antenna / Gain: 3dBi 2. FIT / Part No.: TG.30.8113W Diople Antenna / Gain: 1.59dBi	

**Note:** 1. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3. TEST METHODOLOGY

#### 3.1 DESCRIPTION OF TEST TYPE

The EUT (model: ICG-100-NA-R) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

#### LTE Band 13: 777 MHz ~ 787 MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low channel (L)	23205	779.5	N/A	N/A
Middle channel (M)	23230	752.0	23230	782.0
High channel (H)	23255	784.5	N/A	N/A

## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

**Remark:** Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4407B	MY44212686	03/17/2016
Pre-Amplifier	MITEQ	AFS44-0010265 0-42-10P-44	1042473	04/13/2016
Bilog Antenna	Sunol Sciences	JB1	A0526009	08/05/2016
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101073	07/19/2016
Horn Antenna	EMCO	3117	00055165	01/26/2016
Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW 500	116875	04/13/2016

#### Wugu 966 Chamber A

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Harmonic Mixer	ROHDE&SCHWARZ	FS-Z60	100142	04/16/2016
Horn Antenna	A-INFOMW	LB-19-20-A	J202020872	04/16/2016
Harmonic Mixer	ROHDE&SCHWARZ	FS-Z75	100162	04/21/2016
Horn Antenna	ROHDE&SCHWARZ	FH-PP-75	10001	04/21/2016
Harmonic Mixer	ROHDE&SCHWARZ	FS-Z110	100096	04/23/2016
Horn Antenna	ROHDE&SCHWARZ	FH-PP-110	10003	04/23/2016
Harmonic Mixer	Radiometer Physics Gmbn	SAM-170	20011	04/27/2016
Horn Antenna	Radiometer Physics Gmbn	FH-PP-170	10003	04/27/2016
Harmonic Mixer	Radiometer Physics Gmbn	SAM-220	20013	04/29/2016
Horn Antenna	Radiometer Physics Gmbn	FH-PP-220	10003	04/29/2016
Harmonic Mixer	Radiometer Physics Gmbn	SAM-325	20048	05/04/2016
Horn Antenna	Radiometer Physics Gmbn	FH-PP-325	10007	05/04/2016
Spectrum Analyzer	Agilent	E4446A	US42510268	01/25/2016
EMI Test Receiver	R&S	ESCI	100064	06/03/2016
Bilog Antenna	Sunol Sciences	JB3	A030105	08/05/2016
Horn Antenna	EMCO	3117	00055165	01/26/2016
Horn Antenna	EMCO	3116	26370	12/25/2015
Pre-Amplifier	MITEQ	AMF-6F-260400-4 0-8P	985646	12/25/2015
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Test S/W		EZ-EMC (CCS-3A1RE)		

## 4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

**Remark:** This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.  
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)  
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
- No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan  
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	 Testing Laboratory 1309
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

*\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

### 6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A						

**Remark:**

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

## 7. TEST PROCEDURE AND RESULT

### 7.1 OUTPUT POWER MEASUREMENT

#### LIMITS

Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

Portable stations (hand-held devices) operating in the 698–746 MHz band are limited to 3 watts ERP

#### TEST PROCEDURES

##### **EIRP / ERP MEASUREMENT:**

1. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.
2. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
3. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn
4. E.R.P = E.I.R.P- 2.15 dB

##### **CONDUCTED POWER MEASUREMENT:**

1. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
2. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

## TEST RESULTS

### LTE Band 13

#### Channel Bandwidth: 5MHz

Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)	Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)
QPSK 1 RB ALLOCATED AT THE LOWER EDGE	779.50	23205	21.34	0.1361	QPSK 50% RB ALLOCATION CENTERED	779.50	23205	21.28	0.1343
	782.00	23230	21.45	0.1396		782.00	23230	21.32	0.1355
	784.50	23255	21.30	0.1349		784.50	23255	21.24	0.1330
QPSK 1 RB ALLOCATED AT THE UPPER EDGE	779.50	23205	21.41	0.1384	QPSK 100% RB ALLOCATION CENTERED	779.50	23205	21.20	0.1318
	782.00	23230	<b>*21.48</b>	0.1406		782.00	23230	21.35	0.1365
	784.50	23255	21.37	0.1371		784.50	23255	21.24	0.1330

Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)	Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)
16QAM 1 RB ALLOCATED AT THE LOWER EDGE	779.50	23205	22.46	0.17620	16QAM 1 RB ALLOCATED AT THE LOWER EDGE	779.50	23205	21.87	0.15382
	782.00	23230	22.43	0.17498		782.00	23230	21.91	0.15524
	784.50	23255	22.38	0.17298		784.50	23255	21.85	0.15311
16QAM 1 RB ALLOCATED AT THE UPPER EDGE	779.50	23205	21.76	0.14997	16QAM 1 RB ALLOCATED AT THE UPPER EDGE	779.50	23205	21.75	0.14962
	782.00	23230	21.81	0.15171		782.00	23230	21.71	0.14825
	784.50	23255	<b>*21.86</b>	0.15346		784.50	23255	21.80	0.15136

#### Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**LTE Band 13****Channel Bandwidth: 10MHz**

Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)	Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)
QPSK 1 RB ALLOCATED AT THE LOWER EDGE	782.00	23230	21.20	0.13183	QPSK 50% RB ALLOCATION CENTERED	782.00	23230	<b>*21.31</b>	0.13521
QPSK 1 RB ALLOCATED AT THE UPPER EDGE	782.00	23230	21.21	0.13213	QPSK 100% RB ALLOCATION CENTERED	782.00	23230	21.30	0.13490

Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)	Frequency (MHz)		CH	Peak Power (dBm)	Output Power (W)
16QAM 1 RB ALLOCATED AT THE LOWER EDGE	782.00	23230	<b>*22.32</b>	0.17061	16QAM 50% RB ALLOCATION CENTERED	782.00	23230	21.71	0.14825
16QAM 1 RB ALLOCATED AT THE UPPER EDGE	782.00	23230	21.81	0.15171	16QAM 100% RB ALLOCATION CENTERED	782.00	23230	21.61	0.14488

**Remarks:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**ERP POWER****LTE Band 13****Channel Bandwidth: 5MHz / QPSK**

Channel	Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Pol.
23305	778.1000	15.04	3.3	6.15	17.89	38.45	-20.56	V
	778.1000	7.75	3.3	6.15	10.60	38.45	-27.85	H
23230	783.2000	15.5	3.31	6.15	18.34	38.45	-20.11	V
	780.5000	7.75	3.3	6.12	10.57	38.45	-27.88	H
23255	786.2000	18.14	3.32	6.17	20.99	38.45	-17.46	V
	786.0500	10.42	3.32	6.17	13.27	38.45	-25.18	H

**Channel Bandwidth: 5MHz / 16QAM**

Channel	Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Pol.
23305	777.9500	7.54	3.3	6.14	10.38	38.45	-28.07	V
	778.5500	7.61	3.3	6.14	10.45	38.45	-28.00	H
23230	783.3500	15.46	3.3	6.12	18.28	38.45	-20.17	V
	783.2000	7.91	3.3	6.12	10.73	38.45	-27.72	H
23255	786.0500	18.05	3.32	6.17	20.90	38.45	-17.55	V
	785.6000	10.22	3.32	6.17	13.07	38.45	-25.38	H

**Channel Bandwidth: 10MHz / QPSK**

Channel	Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Pol.
23230	785.3000	14.35	3.32	6.17	17.20	38.45	-21.25	V
	784.8500	7.87	3.32	6.17	10.72	38.45	-27.73	H

**Channel Bandwidth: 10MHz / 16QAM**

Channel	Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Pol.
23230	785.3000	15.56	3.32	6.16	18.40	38.45	-20.05	V
	784.8500	9.27	3.32	6.16	12.11	38.45	-26.34	H

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

## 7.2 FREQUENCY STABILITY MEASUREMENT

### LIMIT

According to the FCC part 27.54 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 1055(a)(1) -30°C ~50°C.

### TEST PROCEDURE

1. Because of the measure the carrier frequency under the condition of the AFC lock, it shall be used the mobile station in the LTE link mode. This is accomplished with the use of the communication simulator station. The oven room could control the temperatures and humidity.
2. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.
3. Laptop pc is connected the external power supply to control the AC input power. The various Volts from the minimum 126.5 Volts to 93.5 Volts. Each step shall be record the frequency error rate.
4. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing.
5. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

**NOTE:** *The frequency error was recorded frequency error from the communication simulator.*

## TEST RESULTS

### FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:

#### LTE Band 13

Reference Frequency: LTE Band 13 782 MHz @ 20°C						
Limit: ± 2.5 ppm = 1775Hz						
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	Limit (Hz)
30	50	781999993	-12	781999995	-10	1775
30	40	781999995	-10	781999999	-6	
30	30	781999998	-7	781999998	-7	
30	20	782000005	0	782000005	0	
30	10	781999994	-11	781999994	-11	
30	0	781999991	-14	781999991	-14	
30	-10	781999992	-13	781999993	-12	
30	-20	781999995	-10	781999996	-9	
30	-30	781999997	-8	781999995	-10	

### FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

#### LTE Band 13

Reference Frequency: LTE Band 13 710 MHz @ 20°C						
Limit: ± 2.5 ppm = 1775Hz						
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	Limit (Hz)
32	20	782000004	-1	782000009	4	1775
30		782000005	0	782000005	0	
25.5		782000009	4	782000007	2	

## 7.3 OCCUPIED BANDWIDTH MEASUREMENT

### LIMITS

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

### TEST PROCEDURES

1. The EUT makes a phone call to the communication simulator. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels. (low, middle and high operational frequency range.)
2. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
3. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

## TEST RESULTS

### LTE Band 13

#### CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	779.5	4.5014
Mid	782.0	4.5204
High	784.5	4.5484

#### CHANNEL BANDWIDTH: 5MHz / 16QAM

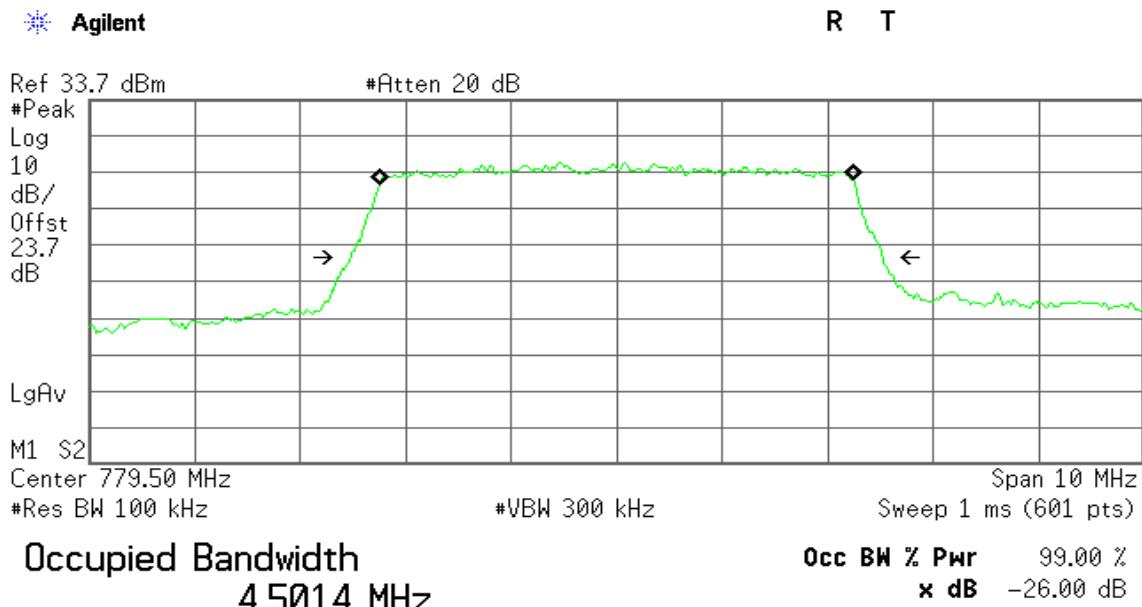
Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	779.5	4.5006
Mid	782.0	4.5194
High	784.5	4.5299

#### CHANNEL BANDWIDTH: 10MHz / QPSK

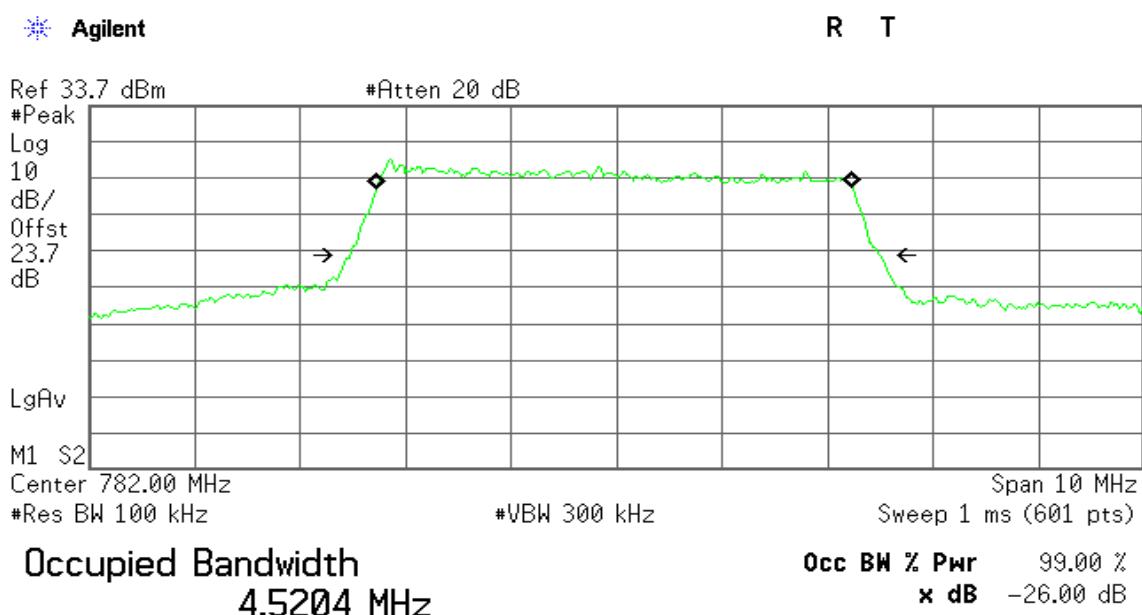
Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Mid	782	8.9524

#### CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Mid	782	8.9488

**LTE Band 13****CHANNEL BANDWIDTH: 5MHz / QPSK****CH Low**

**Transmit Freq Error** 2.386 kHz  
**x dB Bandwidth** 5.054 MHz

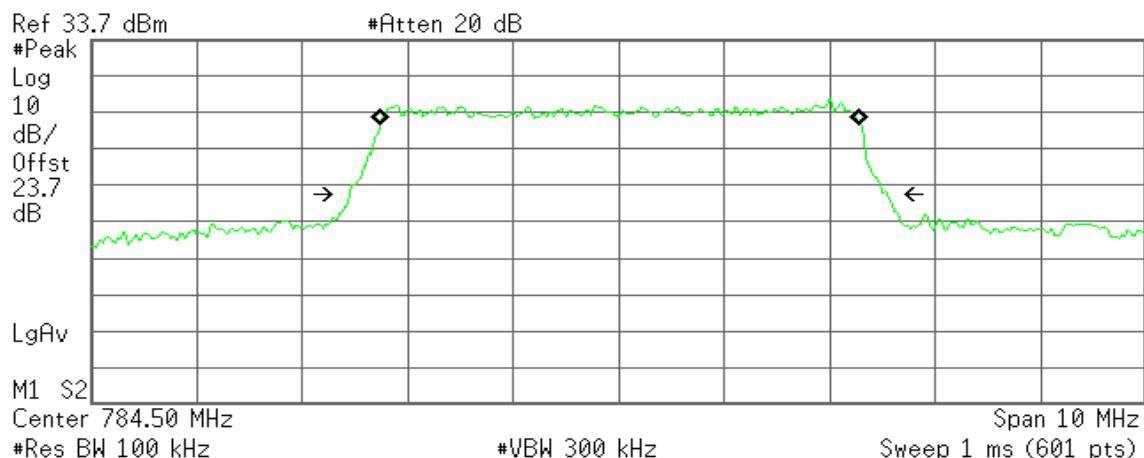
**CH Mid**

**Transmit Freq Error** -19.085 kHz  
**x dB Bandwidth** 5.028 MHz

**CH High**

Agilent

R T

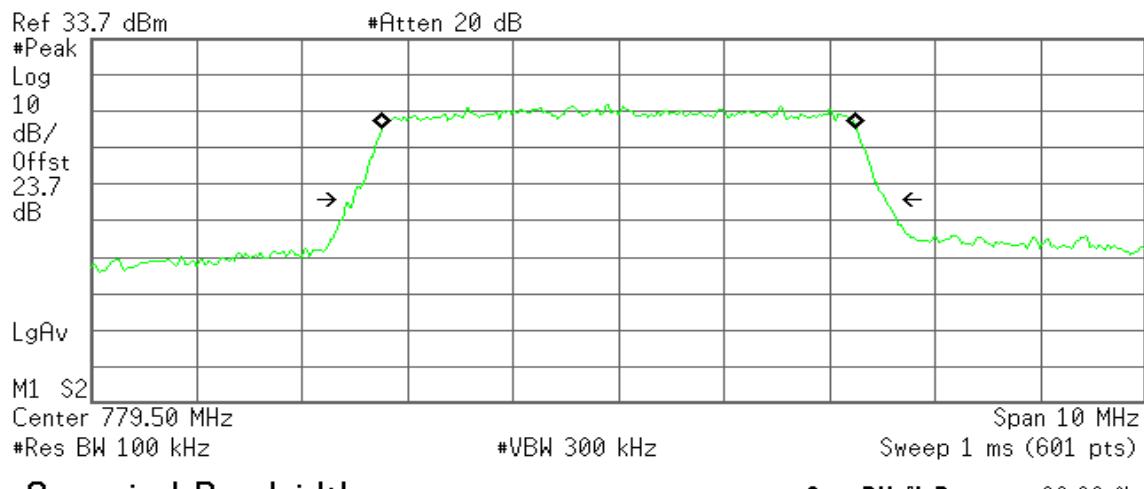


Transmit Freq Error      9.438 kHz  
x dB Bandwidth      5.106 MHz

**CHANNEL BANDWIDTH: 5MHz / 16QAM****CH Low**

Agilent

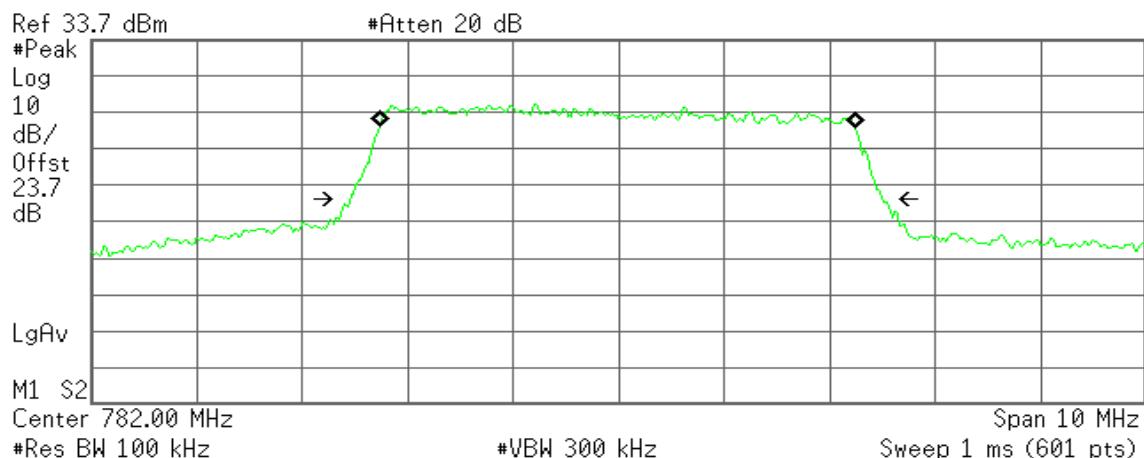
R T



Transmit Freq Error      6.808 kHz  
x dB Bandwidth      5.052 MHz

**CH Mid** Agilent

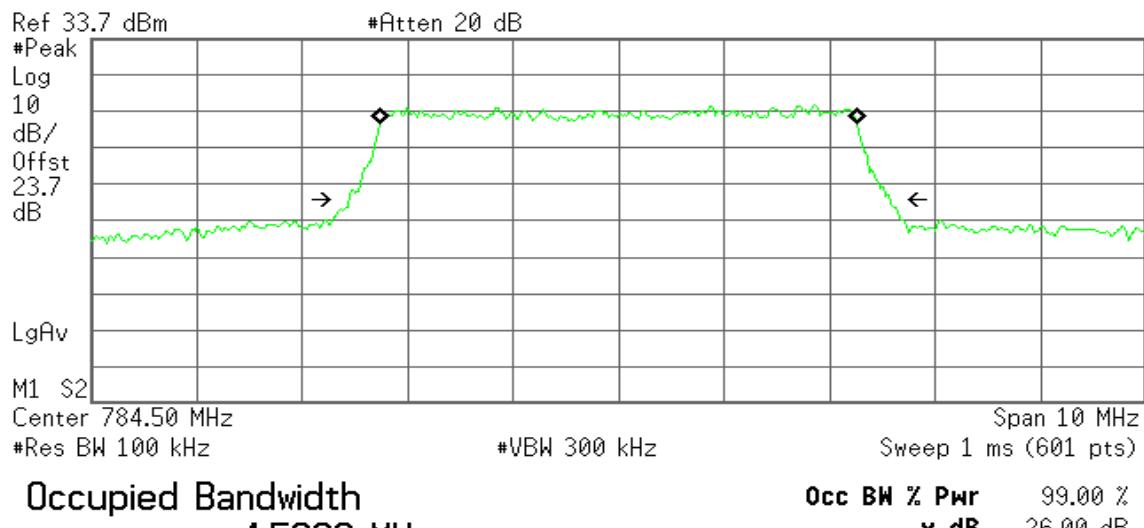
R T



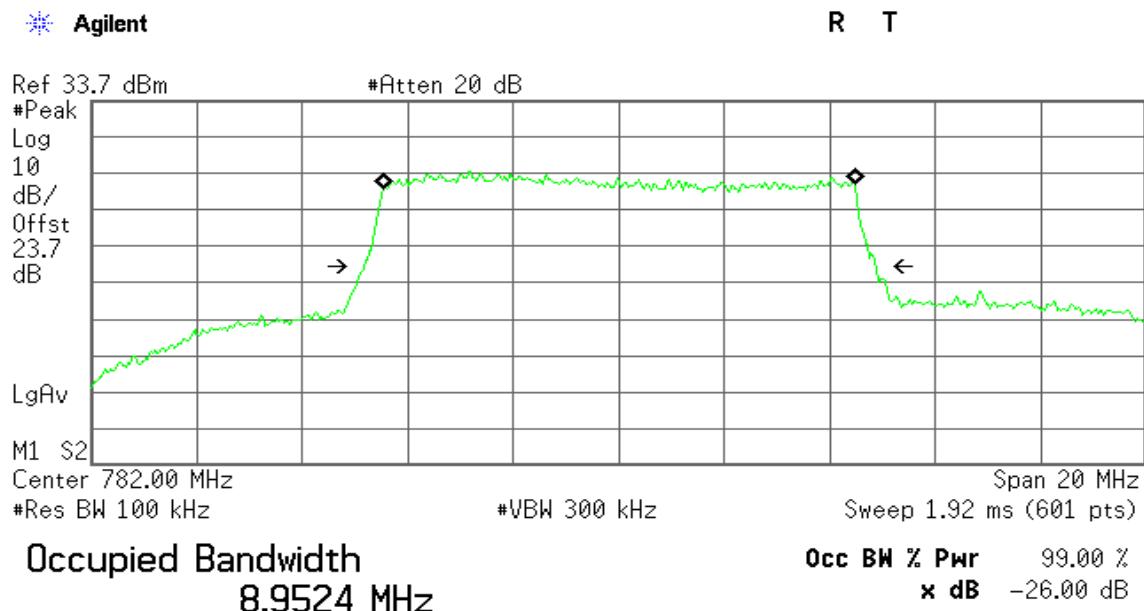
Transmit Freq Error      -12.418 kHz  
x dB Bandwidth      5.047 MHz

**CH High** Agilent

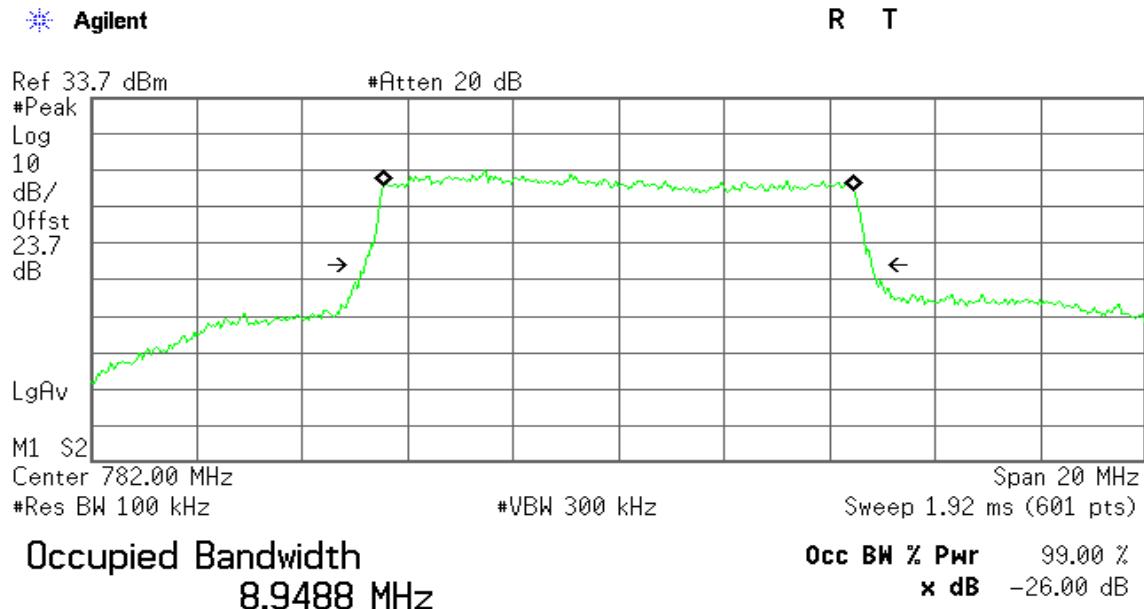
R T



Transmit Freq Error      172.071 Hz  
x dB Bandwidth      5.138 MHz

**CHANNEL BANDWIDTH: 10MHz / QPSK****CH Mid**

**Transmit Freq Error** 8.154 kHz  
**x dB Bandwidth** 9.714 MHz

**CHANNEL BANDWIDTH: 10MHz / 16QAM****CH Mid**

**Transmit Freq Error** 888.597 Hz  
**x dB Bandwidth** 9.628 MHz

## 7.4 PEAK TO AVERAGE RATIO

### **LIMIT**

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

### **TEST PROCEDURES**

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Record the maximum PAPR level associated with a probability of 0.1%.

## TEST RESULTS

### LTE Band 13

#### CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
Low	779.5	21.17
Mid	782.0	21.83
High	784.5	21.63

#### CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB

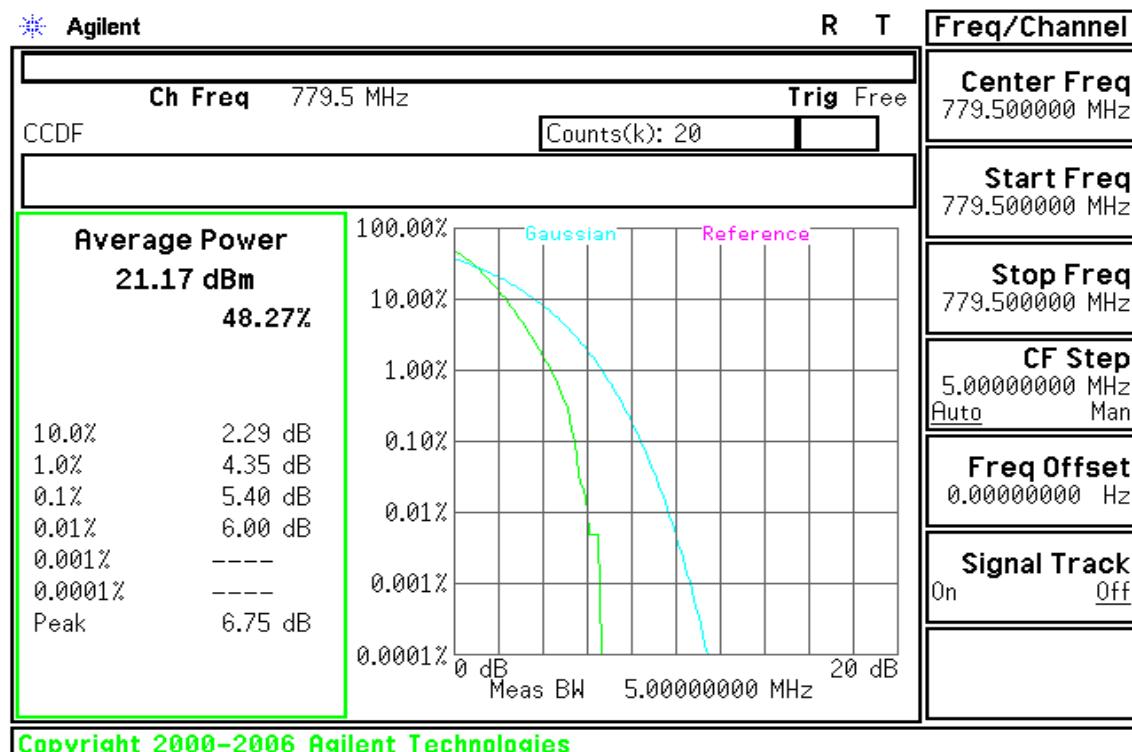
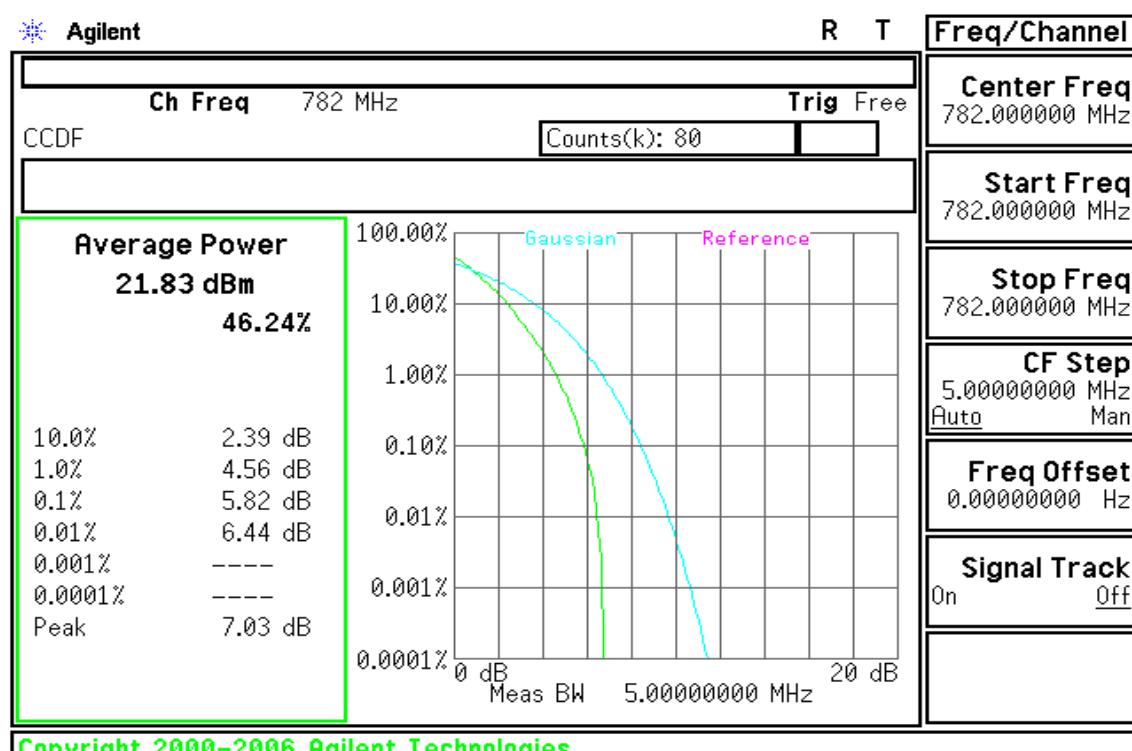
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
Low	779.5	20.20
Mid	782.0	20.83
High	784.5	20.62

#### CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

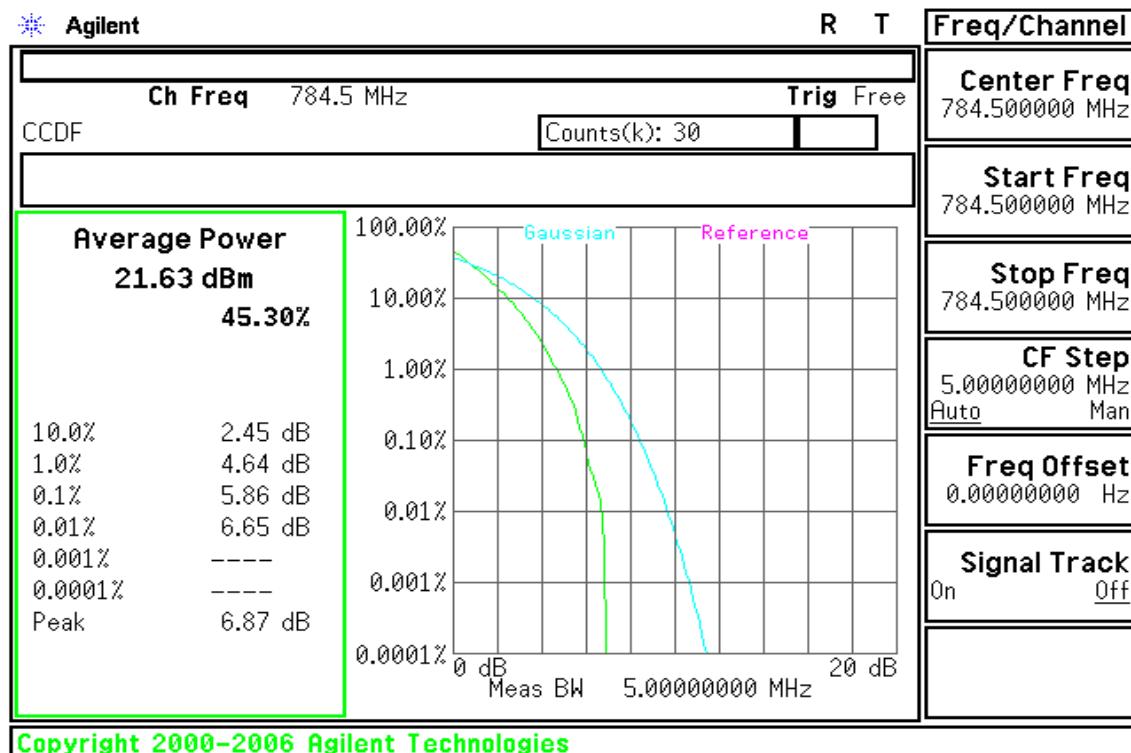
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
Mid	782.0	19.12

#### CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
Mid	782.0	18.12

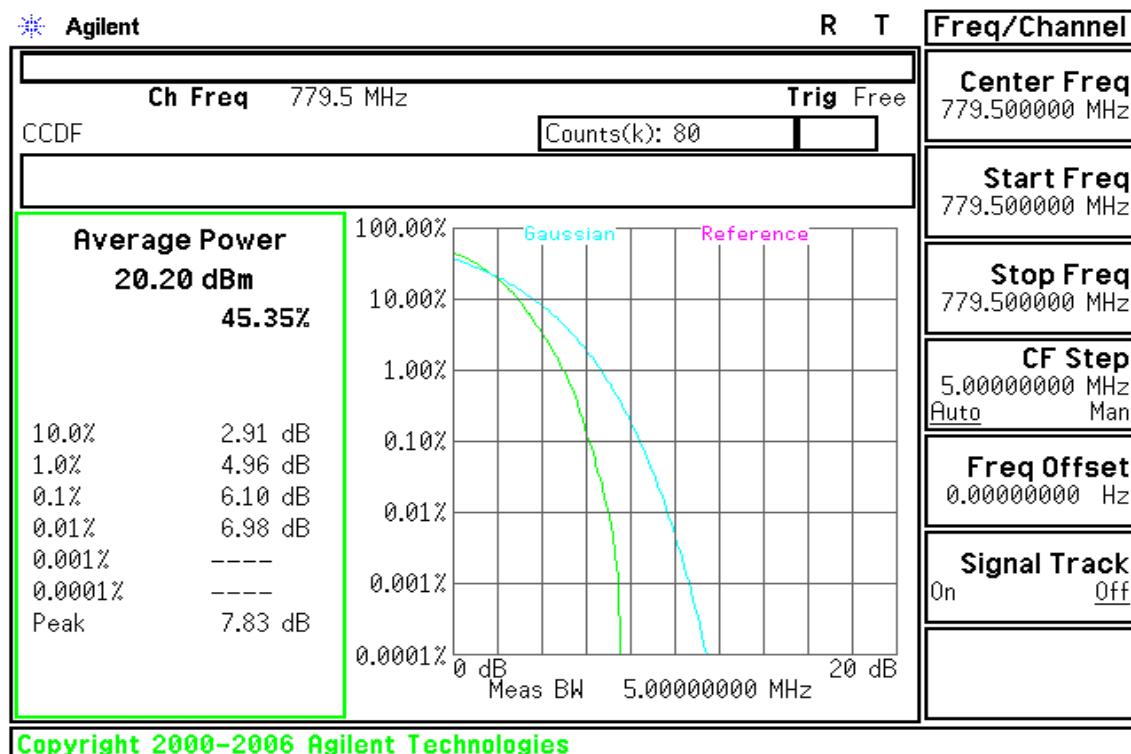
**LTE Band 13****CHANNEL BANDWIDTH: 5MHz / QPSK****CH Low****CH Mid**

## CH High

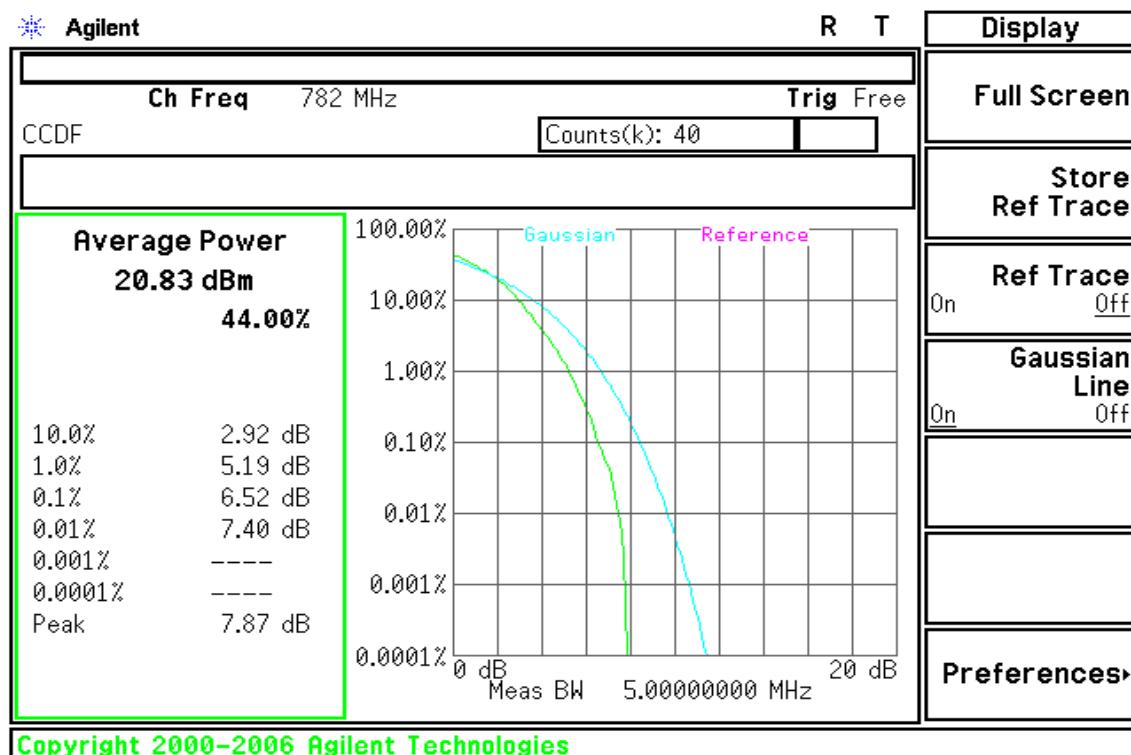


## CHANNEL BANDWIDTH: 5MHz / 16QAM

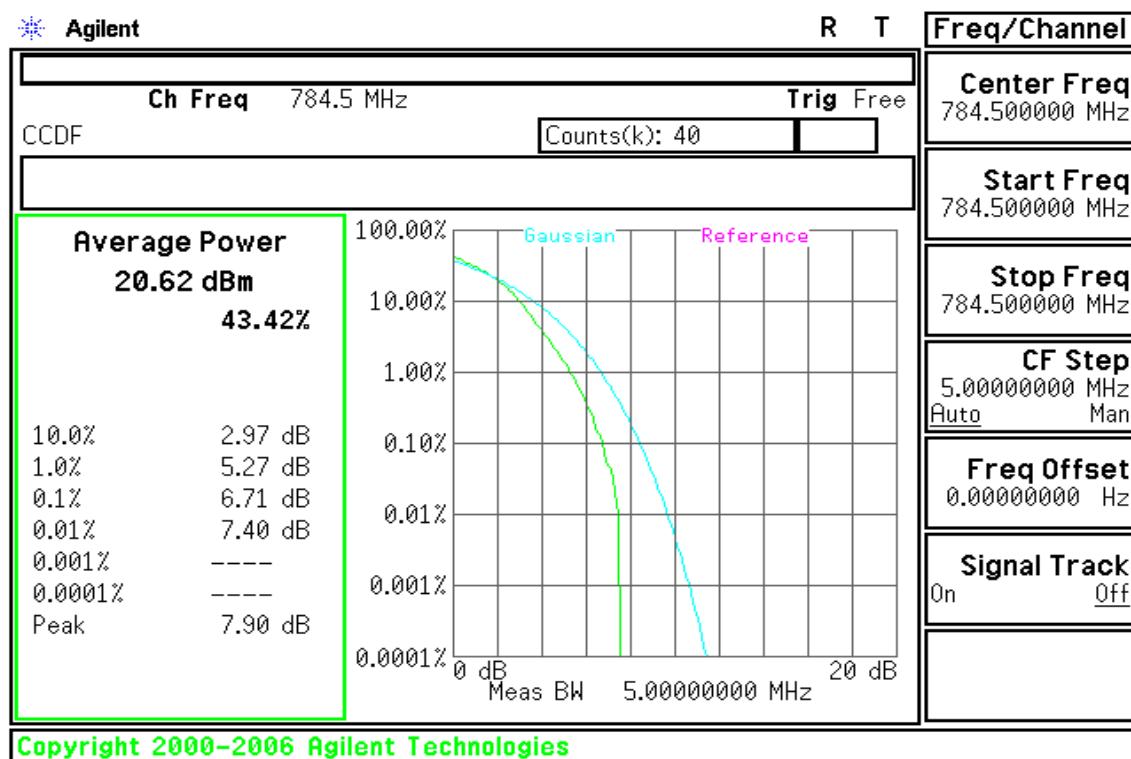
## CH Low



## CH Mid

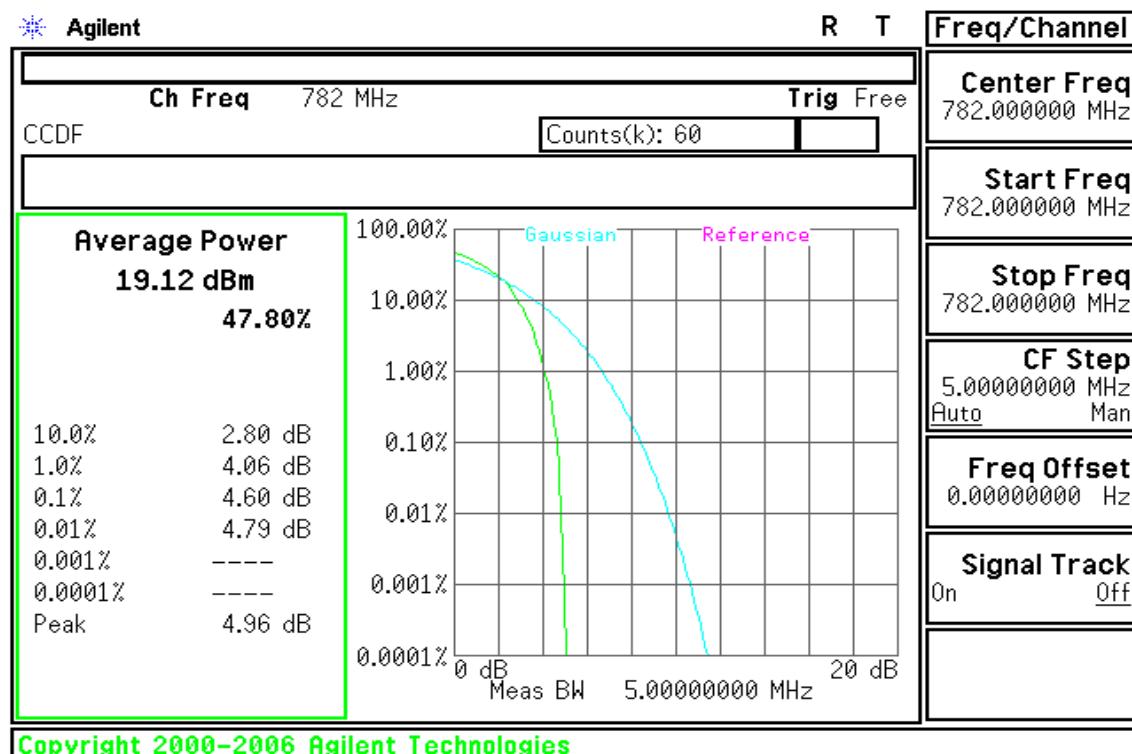


## CH High



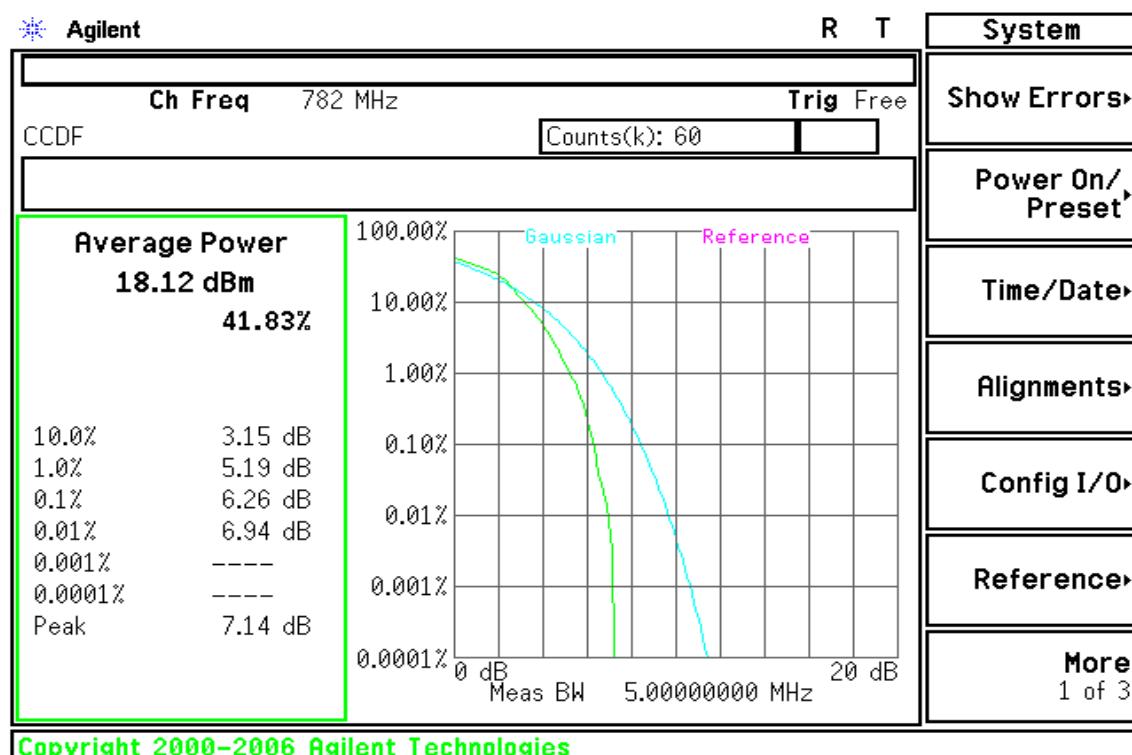
## CHANNEL BANDWIDTH: 10MHz / QPSK

## CH Mid



## CHANNEL BANDWIDTH: 10MHz / 16QAM

## CH Mid



## 7.5 BAND EDGE MEASUREMENT

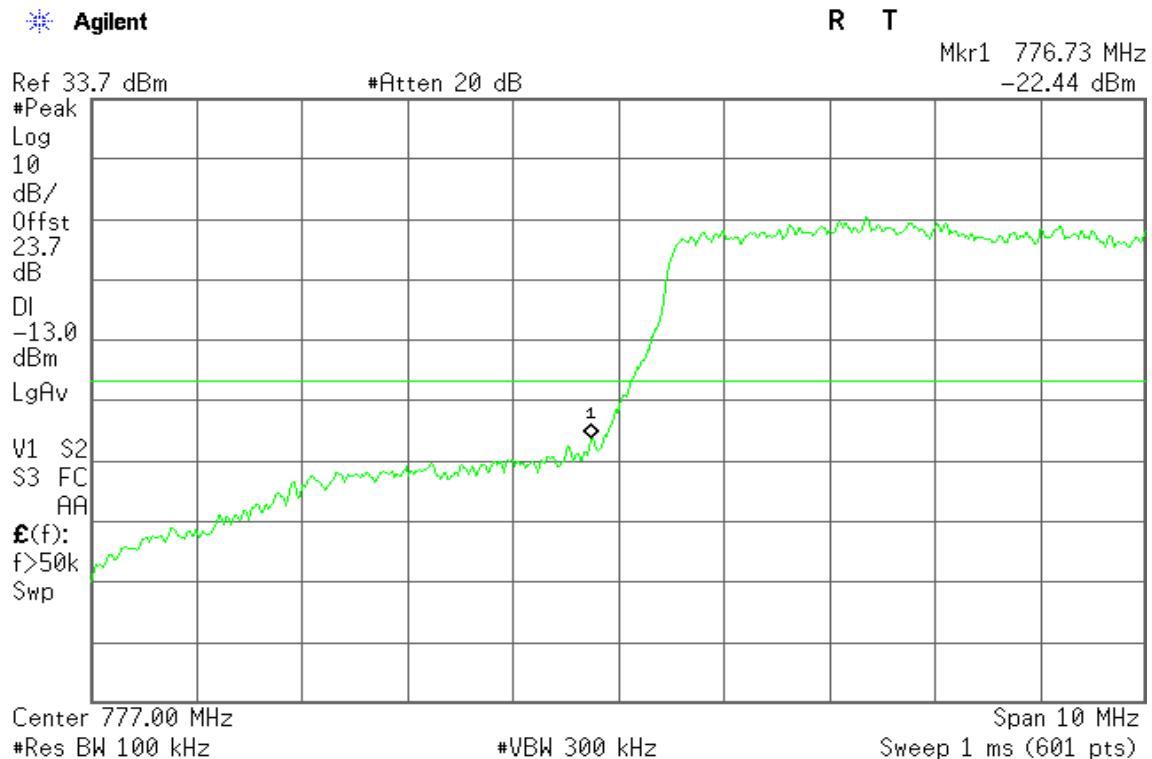
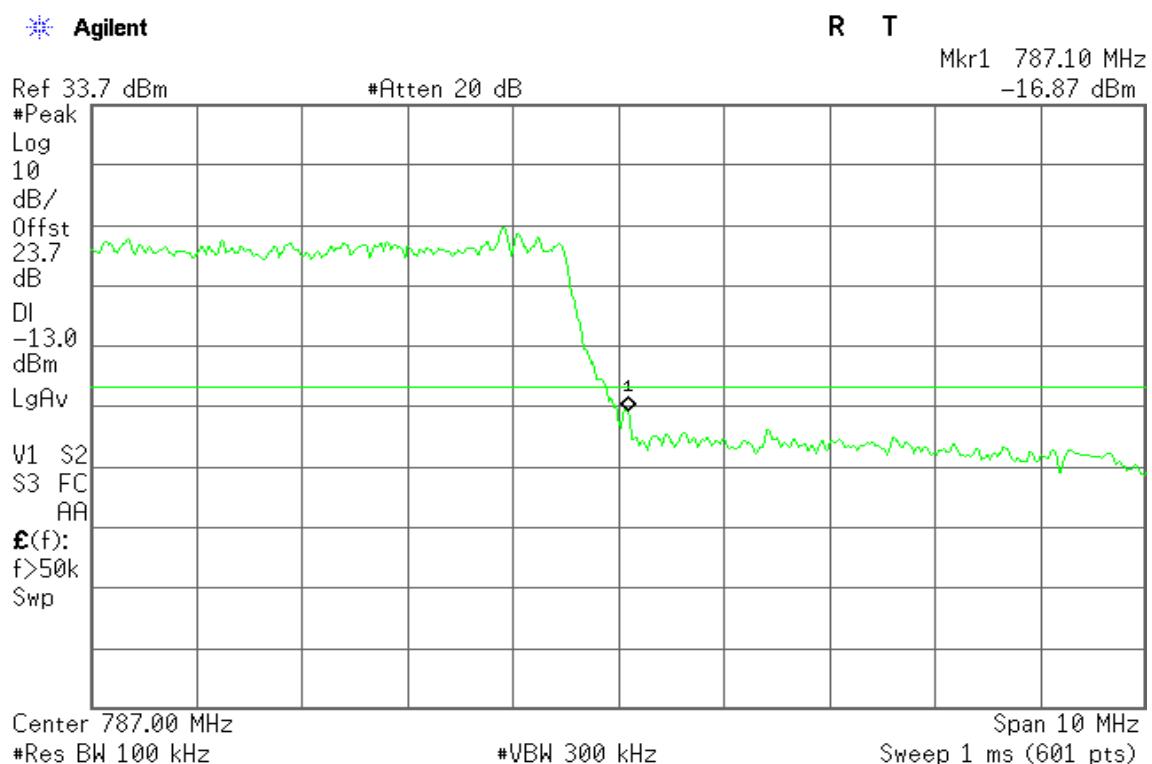
### LIMIT

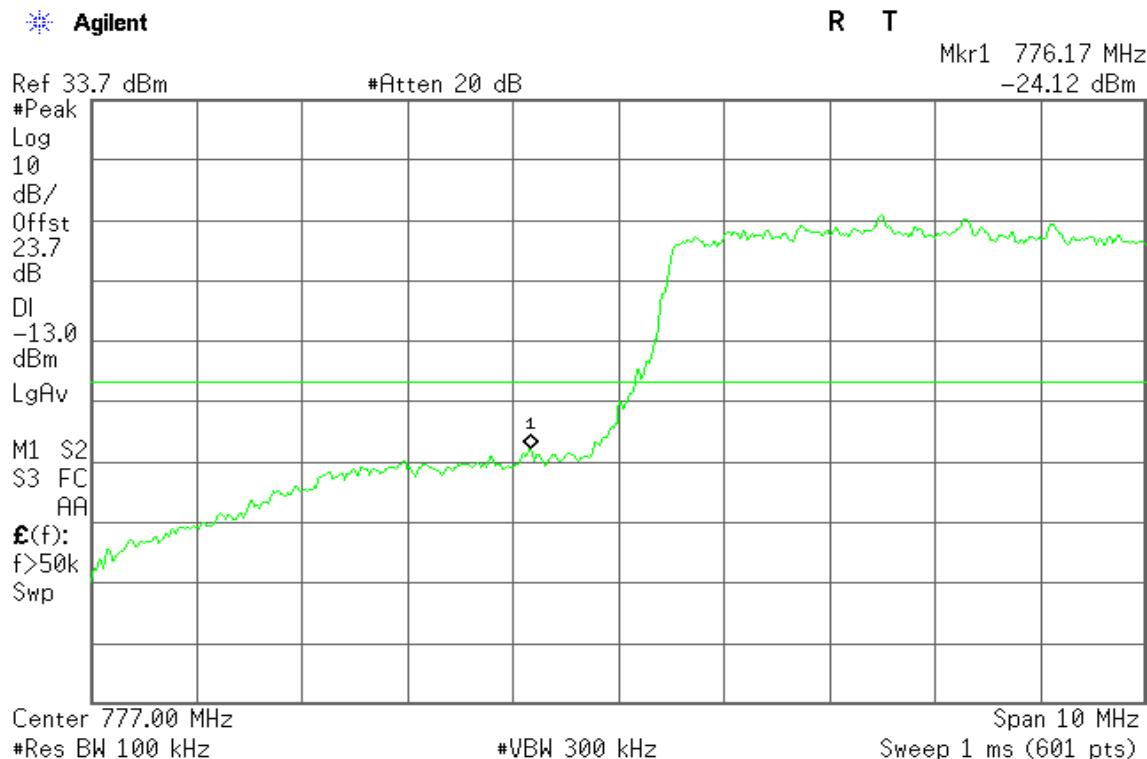
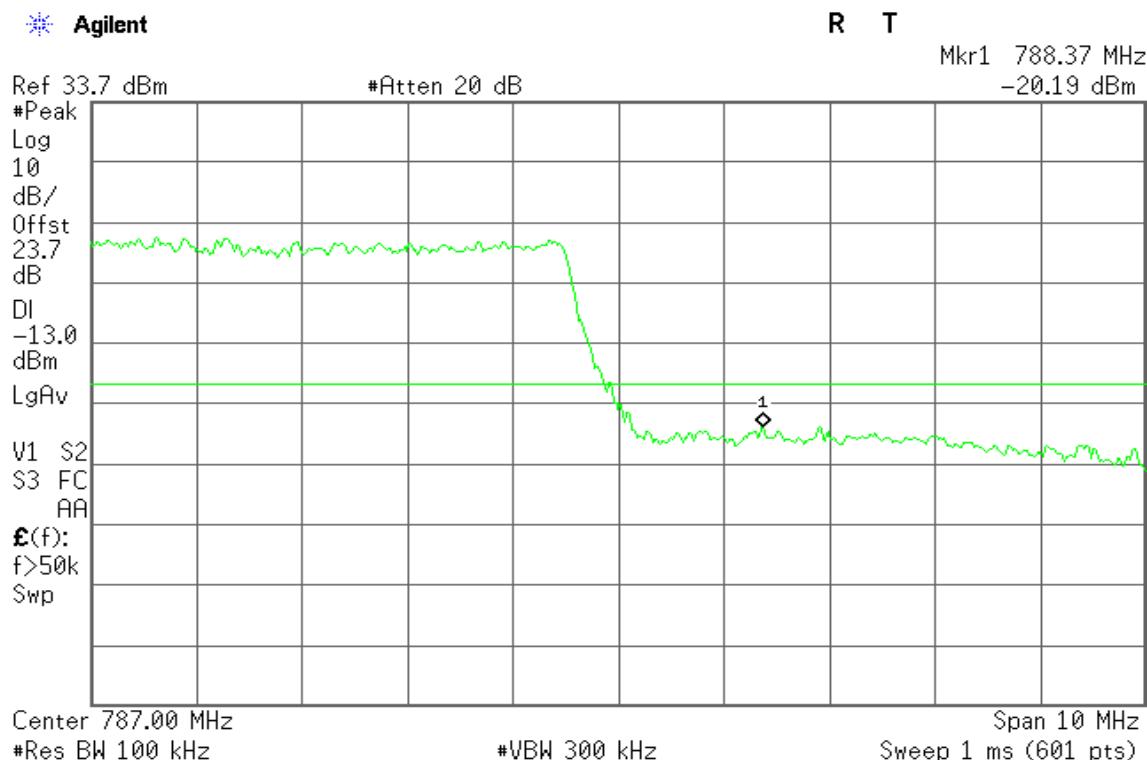
For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed. 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 of emission equal to  $-13 \text{ dBm}$ . In the 1 MHz 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.

### TEST PROCEDURES

1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
2. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 7.2 dB in the transmitted path track.
3. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz.
4. Record the max trace plot into the test report.

**TEST RESULTS:****LTE Band 13****CHANNEL BANDWIDTH: 10MHz / QPSK / FULL RB ALLOCATED****LOWER BAND EDGE****HIGHER BAND EDGE**

**LTE Band 13****CHANNEL BANDWIDTH: 10MHz / 16QAM / FULL RB ALLOCATED****LOWER BAND EDGE****HIGHER BAND EDGE**

## 7.6 CONDUCTED SPURIOUS EMISSIONS

### LIMITS

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 of emission equal to  $-13\text{dBm}$

### TEST PROCEDURES

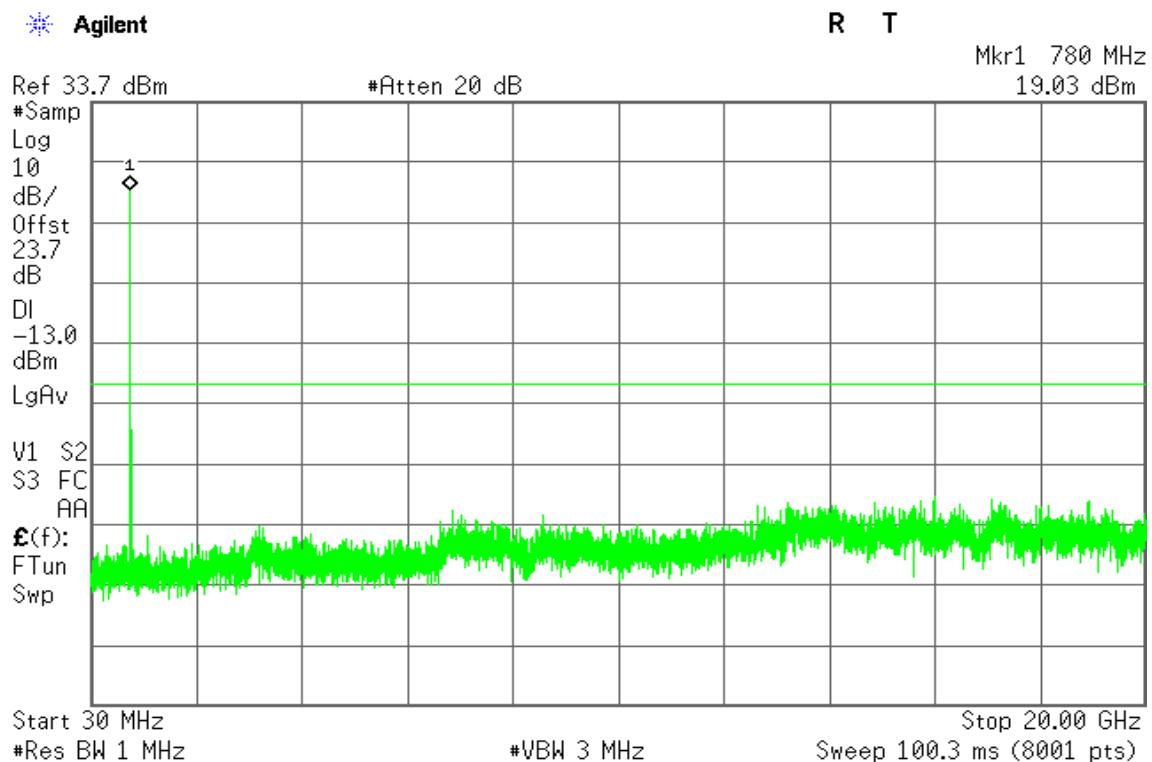
1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range.).
2. The conducted spurious emission used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
3. When the spectrum scanned from 30MHz to 3GHz, it shall be connected to the band reject filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.
4. When the spectrum scanned from 3GHz to 20GHz, it shall be connected to the high pass filter attenuated the carried frequency. The spectrum set RB=1MHz, VB=3MHz.

## TEST RESULTS

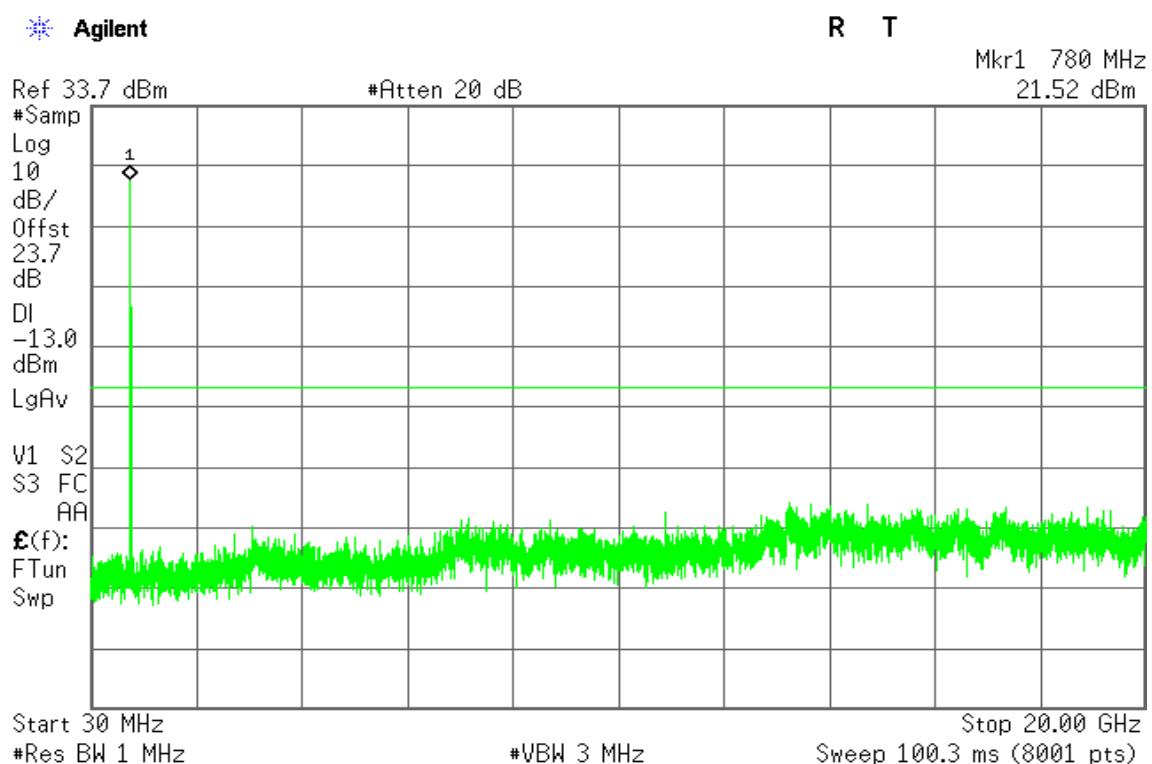
### LTE Band 13

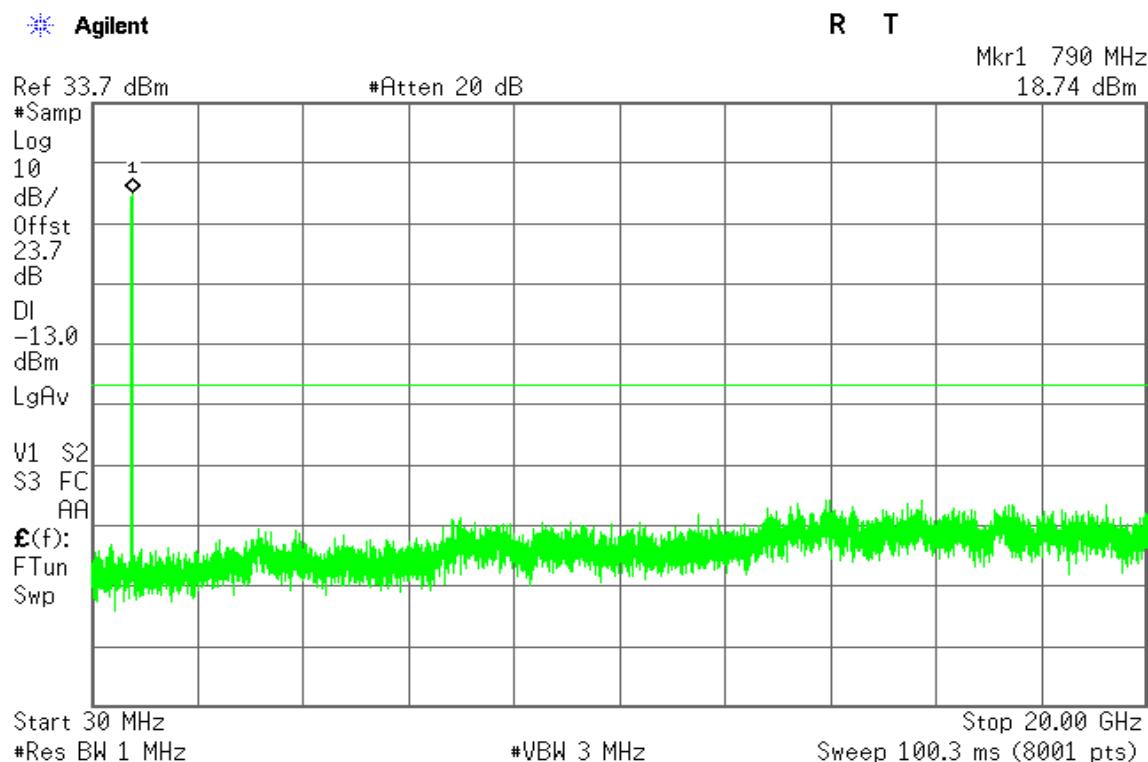
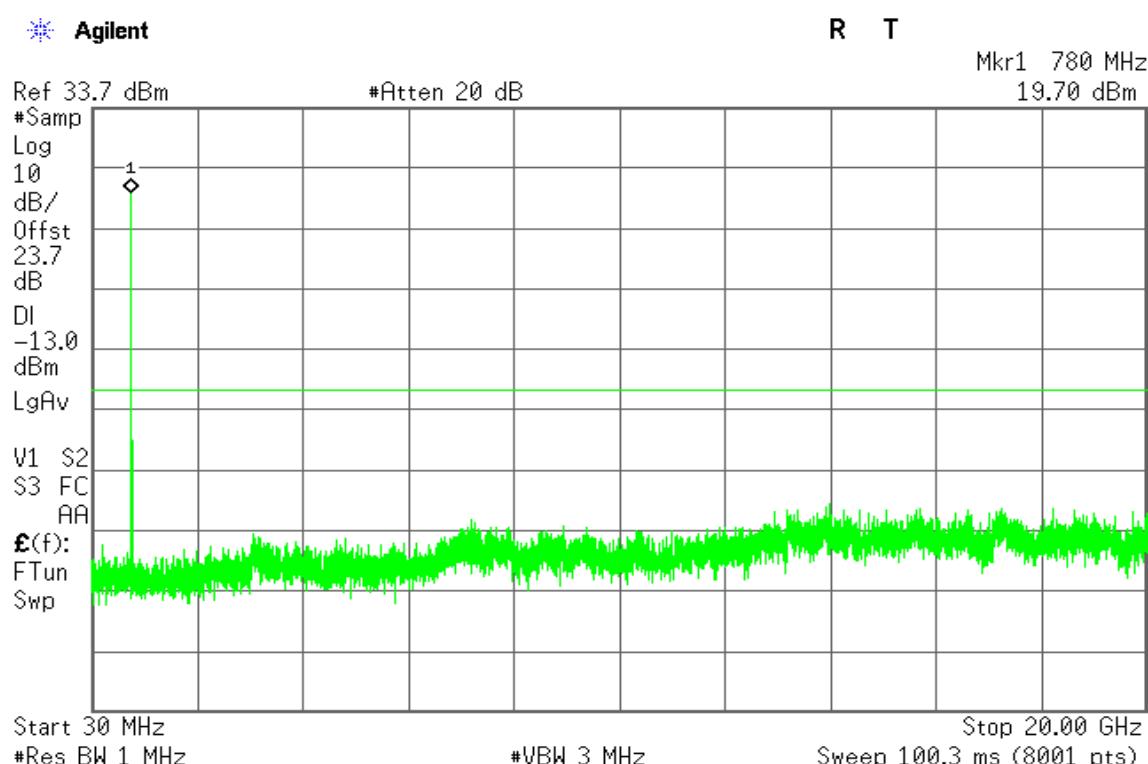
#### CHANNEL BANDWIDTH: 5MHz / QPSK

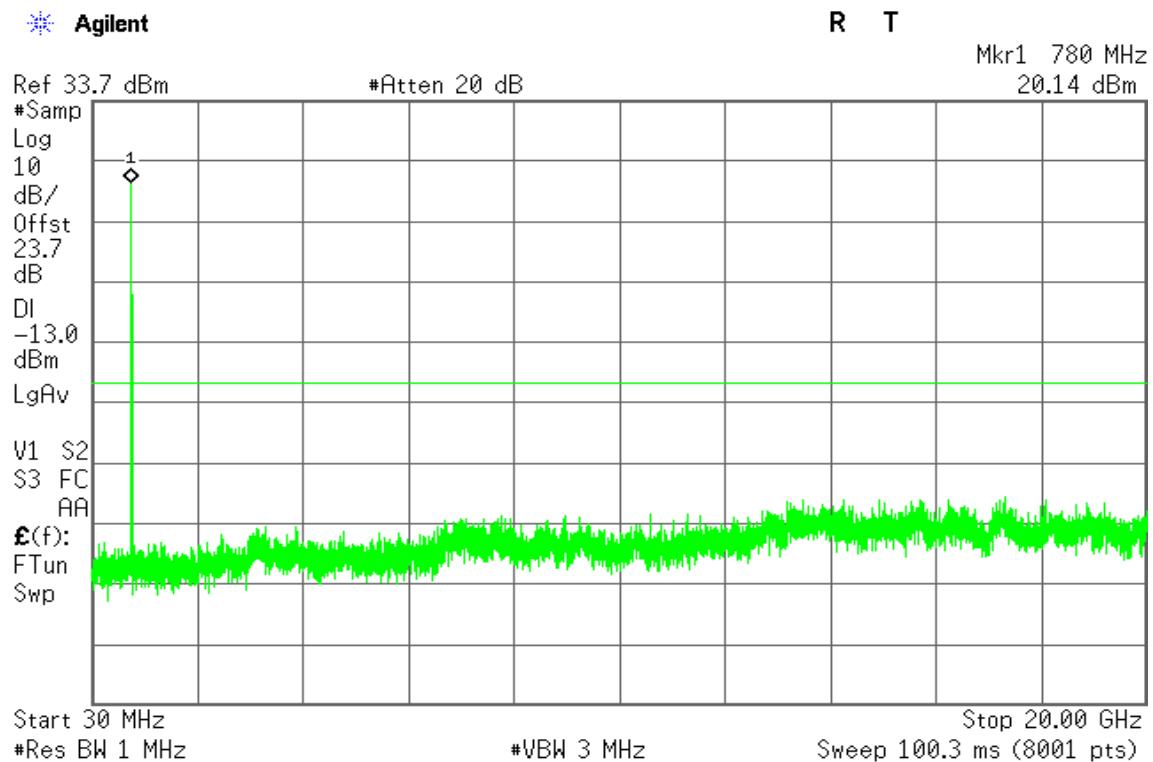
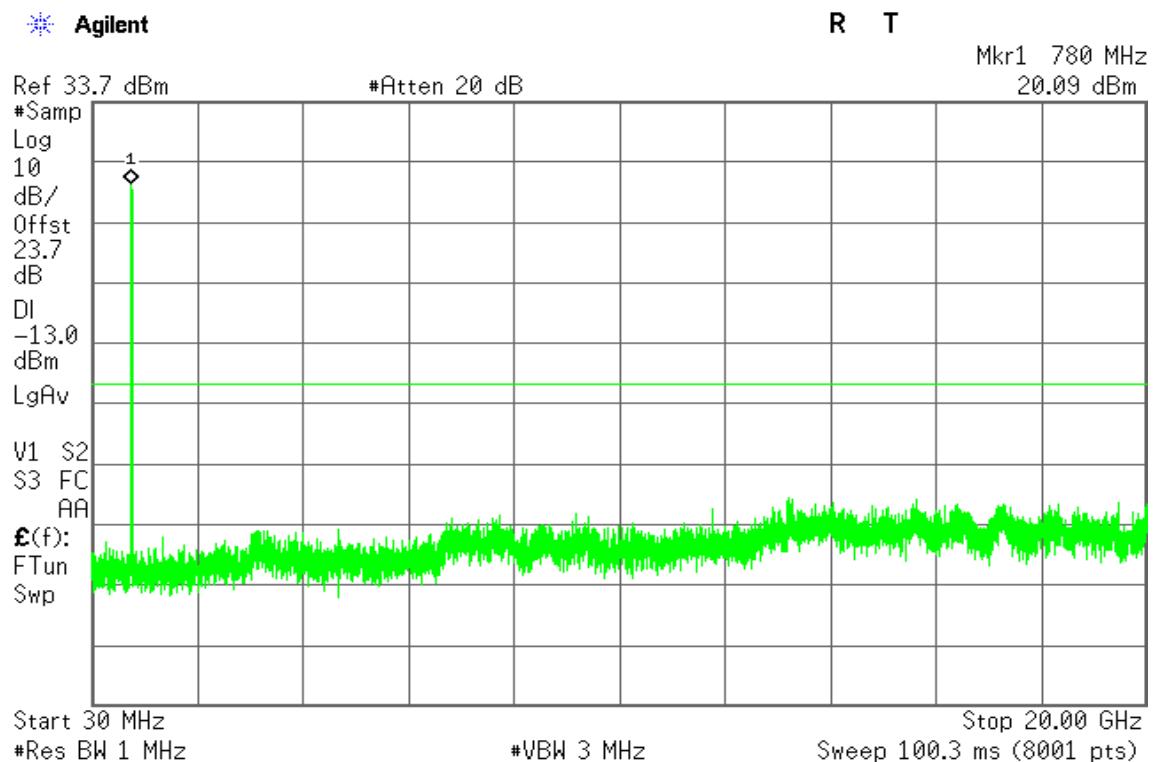
##### CH Low

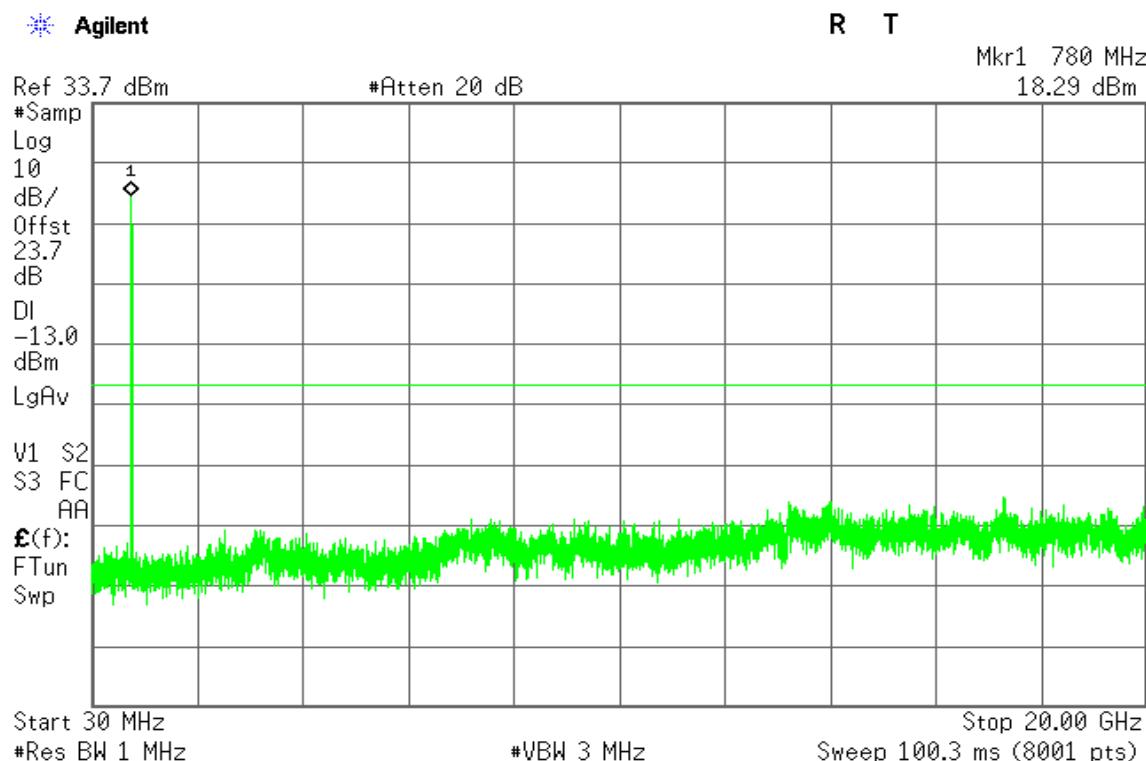
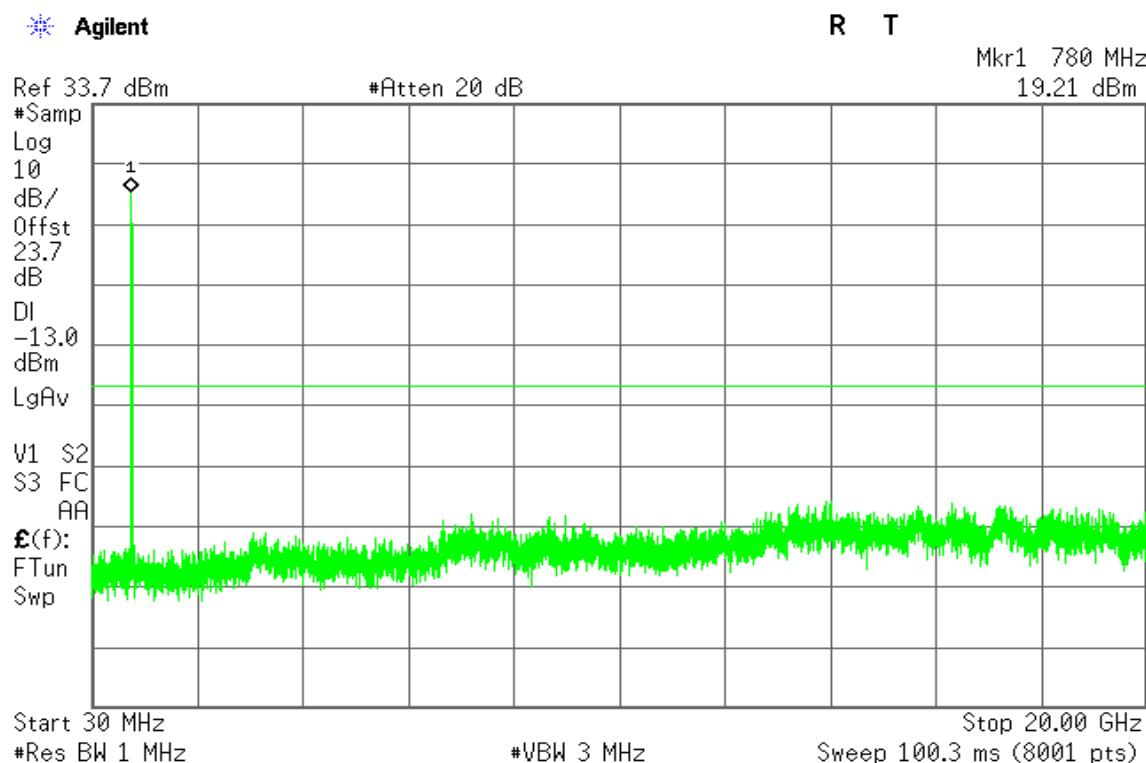


##### CH Mid



**CH High****CHANNEL BANDWIDTH: 5MHz / 16QAM****CH Low**

**CH Mid****CH High**

**CHANNEL BANDWIDTH: 10MHz / QPSK****CH Mid****CHANNEL BANDWIDTH: 10MHz / 16QAM****CH Mid**

## 7.7 RADIATED EMISSION MEASUREMENT

### LIMITS

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 of emission equal to  $-13\text{dBm}$

So the limit of emission is the same absolute specified line.

Limits	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m) (NOTE)
-13	82.22

**NOTE:** The following formula is used to convert the equipment radiated power to field strength.

$$E = [1000000\sqrt{30P}] / 3 \text{ uV/m, where P is Watts}$$

### TEST PROCEDURES

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.
3. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
4. Repeat step 1 ~ 3 for horizontal polarization.

**NOTE:** The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

## TEST RESULTS

### Below 1GHz

#### LTE Band 13 / CHANNEL BANDWIDTH: 5MHz / QPSK

**Operation Mode:** Tx / Low channel      **Test Date:** September 1, 2015  
**Temperature:** 25°C      **Tested by:** Dennis Li  
**Humidity:** 45% RH      **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
82.3800	-66.74	1.06	0.16	-67.64	-13.00	-54.64	V
167.7400	-63.68	1.55	2.26	-62.97	-13.00	-49.97	V
263.7700	-71.76	1.93	5.41	-68.28	-13.00	-55.28	V
312.2700	-74	2.14	5.76	-70.38	-13.00	-57.38	V
375.3200	-74.95	2.31	5.91	-71.35	-13.00	-58.35	V
576.1100	-70.91	2.88	6.05	-67.74	-13.00	-54.74	V
89.1700	-62.35	1.1	0.96	-62.49	-13.00	-49.49	H
167.7400	-58.8	1.55	2.26	-58.09	-13.00	-45.09	H
263.7700	-62.34	1.93	5.41	-58.86	-13.00	-45.86	H
375.3200	-65.16	2.31	5.91	-61.56	-13.00	-48.56	H
551.8600	-64.3	2.81	6.16	-60.95	-13.00	-47.95	H
576.1100	-63.83	2.88	6.05	-60.66	-13.00	-47.66	H

#### **Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

<b>Operation Mode:</b>	Tx / Middle channel	<b>Test Date:</b>	September 1, 2015
<b>Temperature:</b>	25°C	<b>Tested by:</b>	Dennis Li
<b>Humidity:</b>	45% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
50.3700	-66.36	0.81	-4.8	-71.97	-13.00	-58.97	V
167.7400	-63.54	1.55	2.26	-62.83	-13.00	-49.83	V
263.7700	-71.87	1.93	5.41	-68.39	-13.00	-55.39	V
312.2700	-73.95	2.14	5.76	-70.33	-13.00	-57.33	V
551.8600	-73.2	2.81	6.16	-69.85	-13.00	-56.85	V
576.1100	-70.46	2.88	6.05	-67.29	-13.00	-54.29	V
<hr/>							
76.5600	-61.47	1.01	-0.77	-63.25	-13.00	-50.25	H
167.7400	-58.71	1.55	2.26	-58.00	-13.00	-45.00	H
263.7700	-62.54	1.93	5.41	-59.06	-13.00	-46.06	H
368.5300	-66.07	2.3	5.79	-62.58	-13.00	-49.58	H
551.8600	-64.54	2.81	6.16	-61.19	-13.00	-48.19	H
576.1100	-63.79	2.88	6.05	-60.62	-13.00	-47.62	H

### **Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** Tx / High channel    **Test Date:** September 1, 2015  
**Temperature:** 25°C    **Tested by:** Dennis Li  
**Humidity:** 45% RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
52.3100	-65.53	0.82	-4.22	-70.57	-13.00	-57.57	V
167.7400	-62.58	1.55	2.26	-61.87	-13.00	-48.87	V
263.7700	-70.81	1.93	5.41	-67.33	-13.00	-54.33	V
375.3200	-74.89	2.31	5.91	-71.29	-13.00	-58.29	V
576.1100	-70.07	2.88	6.05	-66.90	-13.00	-53.90	V
623.6400	-77.76	2.95	6.14	-74.57	-13.00	-61.57	V
89.1700	-77.88	1.1	0.96	-78.02	-13.00	-65.02	H
167.7400	-58.65	1.55	2.26	-57.94	-13.00	-44.94	H
263.7700	-61.46	1.93	5.41	-57.98	-13.00	-44.98	H
375.3200	-64.24	2.31	5.91	-60.64	-13.00	-47.64	H
551.8600	-64.44	2.81	6.16	-61.09	-13.00	-48.09	H
576.1100	-63.66	2.88	6.05	-60.49	-13.00	-47.49	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 10MHz / QPSK****Operation Mode:** Tx / Middle channel **Test Date:** September 1, 2015**Temperature:** 25°C **Tested by:** Dennis Li**Humidity:** 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
167.7400	-62.36	1.55	2.26	-61.65	-13.00	-48.65	V
263.7700	-71.73	1.93	5.41	-68.25	-13.00	-55.25	V
384.0500	-75.8	2.31	5.99	-72.12	-13.00	-59.12	V
551.8600	-71.02	2.81	6.16	-67.67	-13.00	-54.67	V
576.1100	-68.12	2.88	6.05	-64.95	-13.00	-51.95	V
644.9800	-78.72	3.02	6.19	-75.55	-13.00	-62.55	V
119.2400	-61.77	1.27	-2.07	-65.11	-13.00	-52.11	H
167.7400	-57.34	1.55	2.26	-56.63	-13.00	-43.63	H
263.7700	-60.1	1.93	5.41	-56.62	-13.00	-43.62	H
312.2700	-66.03	2.14	5.76	-62.41	-13.00	-49.41	H
375.3200	-66.72	2.31	5.91	-63.12	-13.00	-50.12	H
576.1100	-60.82	2.88	6.05	-57.65	-13.00	-44.65	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 5MHz / 16QAM****Operation Mode:** Tx / Low channel      **Test Date:** September 1, 2015**Temperature:** 25°C      **Tested by:** Dennis Li**Humidity:** 45% RH      **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
70.7400	-58.97	0.97	-1.72	-61.66	-13.00	-48.66	V
167.7400	-63.86	1.55	2.26	-63.15	-13.00	-50.15	V
263.7700	-71.76	1.93	5.41	-68.28	-13.00	-55.28	V
375.3200	-75.51	2.31	5.91	-71.91	-13.00	-58.91	V
551.8600	-73.1	2.81	6.16	-69.75	-13.00	-56.75	V
576.1100	-70.98	2.88	6.05	-67.81	-13.00	-54.81	V
<hr/>							
104.6900	-61.66	1.18	-1.01	-63.85	-13.00	-50.85	H
167.7400	-58.81	1.55	2.26	-58.10	-13.00	-45.10	H
263.7700	-62.42	1.93	5.41	-58.94	-13.00	-45.94	H
375.3200	-63.6	2.31	5.91	-60.00	-13.00	-47.00	H
551.8600	-64.28	2.81	6.16	-60.93	-13.00	-47.93	H
576.1100	-63.77	2.88	6.05	-60.60	-13.00	-47.60	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

<b>Operation Mode:</b>	Tx / Middle channel	<b>Test Date:</b>	September 1, 2015
<b>Temperature:</b>	25°C	<b>Tested by:</b>	Dennis Li
<b>Humidity:</b>	45% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
56.1900	-64.86	0.85	-3.09	-68.80	-13.00	-55.80	V
167.7400	-63.38	1.55	2.26	-62.67	-13.00	-49.67	V
312.2700	-74.24	2.14	5.76	-70.62	-13.00	-57.62	V
500.4500	-80.78	2.7	5.9	-77.58	-13.00	-64.58	V
576.1100	-70.78	2.88	6.05	-67.61	-13.00	-54.61	V
723.5500	-79.53	3.17	6.47	-76.23	-13.00	-63.23	V
120.2100	-60.3	1.27	-2.06	-63.63	-13.00	-50.63	H
167.7400	-58.91	1.55	2.26	-58.20	-13.00	-45.20	H
263.7700	-61.92	1.93	5.41	-58.44	-13.00	-45.44	H
375.3200	-64.1	2.31	5.91	-60.50	-13.00	-47.50	H
576.1100	-63.84	2.88	6.05	-60.67	-13.00	-47.67	H
644.0100	-75.86	3.02	6.17	-72.71	-13.00	-59.71	H

### **Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** Tx / High channel    **Test Date:** September 1, 2015  
**Temperature:** 25°C    **Tested by:** Dennis Li  
**Humidity:** 45% RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
51.3400	-66.06	0.81	-4.51	-71.38	-13.00	-58.38	V
167.7400	-62.46	1.55	2.26	-61.75	-13.00	-48.75	V
263.7700	-69.95	1.93	5.41	-66.47	-13.00	-53.47	V
375.3200	-75.25	2.31	5.91	-71.65	-13.00	-58.65	V
527.6100	-76.08	2.74	6.02	-72.80	-13.00	-59.80	V
576.1100	-69.73	2.88	6.05	-66.56	-13.00	-53.56	V
127.0000	-58.42	1.32	-1.63	-61.37	-13.00	-48.37	H
167.7400	-58.48	1.55	2.26	-57.77	-13.00	-44.77	H
263.7700	-62.07	1.93	5.41	-58.59	-13.00	-45.59	H
375.3200	-64.61	2.31	5.91	-61.01	-13.00	-48.01	H
551.8600	-64.52	2.81	6.16	-61.17	-13.00	-48.17	H
576.1100	-63.83	2.88	6.05	-60.66	-13.00	-47.66	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 10MHz / 16QAM****Operation Mode:** Tx / Middle channel **Test Date:** September 1, 2015**Temperature:** 25°C **Tested by:** Dennis Li**Humidity:** 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
75.5900	-61.09	1.01	-0.94	-63.04	-13.00	-50.04	V
167.7400	-62.81	1.55	2.26	-62.10	-13.00	-49.10	V
263.7700	-71.53	1.93	5.41	-68.05	-13.00	-55.05	V
312.2700	-71.9	2.14	5.76	-68.28	-13.00	-55.28	V
375.3200	-74.37	2.31	5.91	-70.77	-13.00	-57.77	V
576.1100	-67.81	2.88	6.05	-64.64	-13.00	-51.64	V
119.2400	-61.77	1.27	-2.07	-65.11	-13.00	-52.11	H
167.7400	-57.34	1.55	2.26	-56.63	-13.00	-43.63	H
263.7700	-60.1	1.93	5.41	-56.62	-13.00	-43.62	H
312.2700	-66.03	2.14	5.76	-62.41	-13.00	-49.41	H
375.3200	-66.72	2.31	5.91	-63.12	-13.00	-50.12	H
576.1100	-60.82	2.88	6.05	-57.65	-13.00	-44.65	H

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Above 1GHz**LTE Band 13 / CHANNEL BANDWIDTH: 5MHz / QPSK**

**Operation Mode:** Tx / Low channel      **Test Date:** September 1, 2015  
**Temperature:** 25°C      **Tested by:** Dennis Li  
**Humidity:** 45% RH      **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1553.000	-57.81	4.92	6.2	-56.53	-13.00	-43.53	V
2463.000	-35.46	6.29	6.05	-35.70	-13.00	-22.70	V
N/A							
1553.000	-54.54	4.92	6.2	-53.26	-13.00	-40.26	H
2463.000	-27.93	6.29	6.05	-28.17	-13.00	-15.17	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

<b>Operation Mode:</b>	Tx / Middle channel	<b>Test Date:</b>	September 1, 2015
<b>Temperature:</b>	25°C	<b>Tested by:</b>	Dennis Li
<b>Humidity:</b>	45% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1770.000	-49.32	5.24	5.81	-48.75	-13.00	-35.75	V
2463.000	-30.89	6.29	6.05	-31.13	-13.00	-18.13	V
N/A							
1770.000	-42.72	5.24	5.81	-42.15	-13.00	-29.15	H
2463.000	-25.8	6.29	6.05	-26.04	-13.00	-13.04	H
N/A							

### **Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** Tx / High channel    **Test Date:** September 1, 2015  
**Temperature:** 25°C    **Tested by:** Dennis Li  
**Humidity:** 45% RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1567.000	-53.6	4.94	6.18	-52.36	-13.00	-39.36	V
2463.000	-28.17	6.29	6.05	-28.41	-13.00	-15.41	V
N/A							
1567.000	-51.28	4.94	6.18	-50.04	-13.00	-37.04	H
2463.000	-24.08	6.29	6.05	-24.32	-13.00	-11.32	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 10MHz / QPSK****Operation Mode:** Tx / Middle channel **Test Date:** September 1, 2015**Temperature:** 25°C **Tested by:** Dennis Li**Humidity:** 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1567.000	-56.88	4.94	6.18	-55.64	-13.00	-42.64	V
2463.000	-33.05	6.29	6.05	-33.29	-13.00	-20.29	V
N/A							
1798.000	-56.84	5.29	5.76	-56.37	-13.00	-43.37	H
2463.000	-28.04	6.29	6.05	-28.28	-13.00	-15.28	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 5MHz / 16QAM****Operation Mode:** Tx / Low channel      **Test Date:** September 1, 2015**Temperature:** 25°C      **Tested by:** Dennis Li**Humidity:** 45% RH      **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1959.000	-52.71	5.61	5.47	-52.85	-13.00	-39.85	V
2463.000	-31.6	6.29	6.05	-31.84	-13.00	-18.84	V
N/A							
1553.000	-55.6	4.92	6.2	-54.32	-13.00	-41.32	H
2463.000	-25.01	6.29	6.05	-25.25	-13.00	-12.25	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

<b>Operation Mode:</b>	Tx / Middle channel	<b>Test Date:</b>	September 1, 2015
<b>Temperature:</b>	25°C	<b>Tested by:</b>	Dennis Li
<b>Humidity:</b>	45% RH	<b>Polarity:</b>	Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1560.000	-56.92	4.93	6.19	-55.66	-13.00	-42.66	V
2463.000	-33.73	6.29	6.05	-33.97	-13.00	-20.97	V
N/A							
1560.000	-55.12	4.93	6.19	-53.86	-13.00	-40.86	H
2463.000	-22.75	6.29	6.05	-22.99	-13.00	-9.99	H
N/A							

### **Remark:**

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*

**Operation Mode:** Tx / High channel    **Test Date:** September 1, 2015  
**Temperature:** 25°C    **Tested by:** Dennis Li  
**Humidity:** 45% RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1756.000	-44.54	5.21	5.84	-43.91	-13.00	-30.91	V
2463.000	-34.99	6.29	6.05	-35.23	-13.00	-22.23	V
N/A							
1567.000	-51.51	4.94	6.18	-50.27	-13.00	-37.27	H
2463.000	-23.76	6.29	6.05	-24.00	-13.00	-11.00	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

**LTE Band 13 / CHANNEL BANDWIDTH: 10MHz / 16QAM****Operation Mode:** Tx / Middle channel **Test Date:** September 1, 2015**Temperature:** 25°C **Tested by:** Dennis Li**Humidity:** 45% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
1567.000	-56.28	4.94	6.18	-55.04	-13.00	-42.04	V
2463.000	-32.59	6.29	6.05	-32.83	-13.00	-19.83	V
N/A							
2463.000	-28.27	6.29	6.05	-28.51	-13.00	-15.51	H
5970.000	-48.06	10.7	10.89	-47.87	-13.00	-34.87	H
N/A							

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.