FCC RADIO TEST REPORT

FCC ID	:	**AZ489FT7104**
Equipment	:	**LEX L11 Mission Critical LTE Device**
Brand Name	:	**Motorola Solutions**
Model Name	:	**LEX L11n**
Applicant	:	**Motorola Solutions, Inc.** **8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322**
Manufacturer	:	**Motorola Solutions Penang** **Motorola Solutions Malaysia Sd. Bhd., Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900, Bayan Lepas, Penang, Malaysia**
Standard	:	**47 CFR Part 2, 22(H), 24(E), 27**

The product was received on Aug. 06, 2018 and testing was started from Aug. 15, 2018 and completed on Aug. 28, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Joseph Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FG851419-01A	01	Initial issue of report	Sep. 14, 2018

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§22.913 (a)(2)	Effective Radiated Power (Band 26)	Pass	
	§27.50 (b)(10) §27.50 (c)(10)	Effective Radiated Power (Band 13) (Band 17)		
	§24.232 (c) §27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 25) (Band 41)		
3.3	§24.232 (d)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2)(4) §27.53 (g)	Conducted Band Edge Measurement (Band 13) (Band 17) (Band 25) (Band 26)	Pass	-
	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 41)		
3.6	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (g)	Conducted Spurious Emission (Band 13) (Band 17) (Band 25) (Band 26)	Pass	-
	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 41)		
3.7	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (f) §27.53 (g)	Radiated Spurious Emission (Band 13) (Band 17) (Band 25) (Band 26)	Pass	Under limit 8.04 dB at 10332.000 MHz
	§2.1053 §27.53 (m)(4)	Radiated Spurious Emission (Band 41)		

Remark:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by adding LTE Band 13, 17, 25, 26, and 41. All the test cases were performed on original report which can be referred to other report. Based on the original report, the test cases were verified.

Reviewed by: Wii Chang

Report Producer: Maggie Chiang

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, NFC, and GNSS.

Product Specification subjective to this standard	
Antenna Type	WWAN: Monopole Antenna WLAN: Monopole Antenna Bluetooth: Monopole Antenna GPS: Monopole Antenna NFC: Loop Antenna

Accessories Information				
AC Adapter	**Brand Name**	Motorola Solutions	**Model Name**	MU08-L050150-A1
Battery 1	**Brand Name**	Motorola Solutions	**Model Name**	PMNN4546A
Battery 2	**Brand Name**	Motorola Solutions	**Model Name**	PMNN4545A
USB Cable	**Brand Name**	Motorola Solutions	**Model Name**	CB000756A01

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	TH05-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH15-HY

Note: The test site complies with ANSI C63.4 2014 requirement.

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 22(H), 24(E), 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

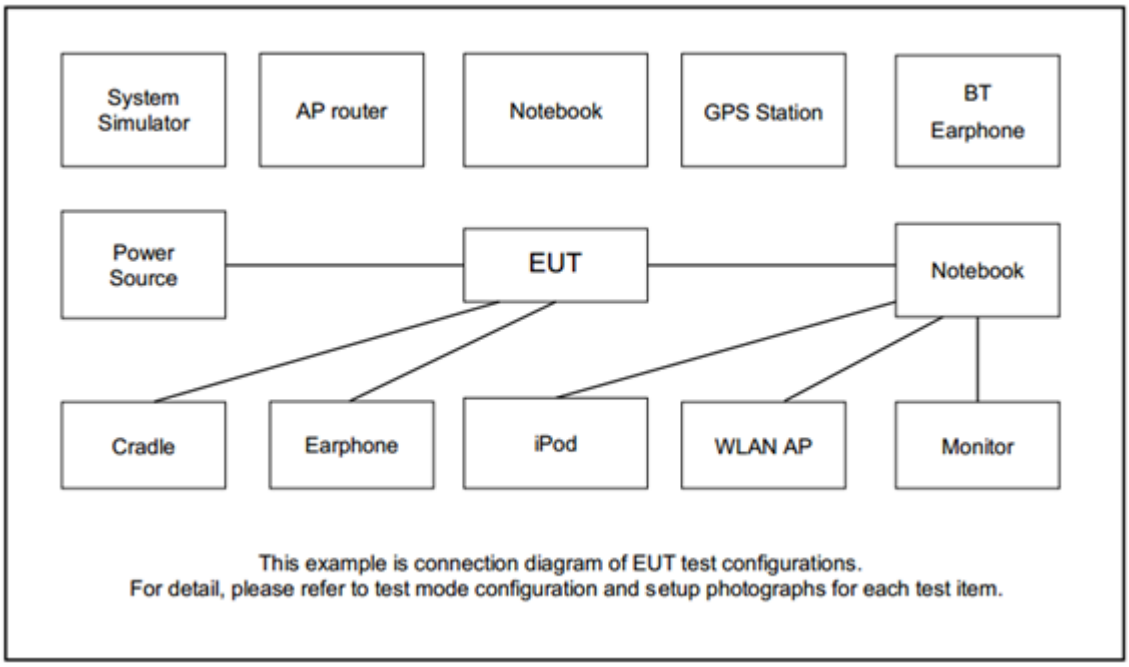
Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y Plane for Band 25 and Band 41 ; Z plane for Band 13 and Band 26) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v
	25	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	26	v	v	v	v	v	-	v	v	v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	13	-	-		v	-	-	v	v	v		v		v	
	17	-	-		v	-	-	v	v	v		v	v	v	v
	25						v	v	v	v		v	v	v	v
	26					v	-	v	v	v		v	v	v	v
	41	-	-				v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	13	-	-	v	v	-	-	v	v			v	v	v	v
	17	-	-	v	v	-	-	v	v			v	v	v	v
	25	v	v	v	v	v	v	v	v			v	v	v	v
	26	v	v	v	v	v	-	v	v			v	v	v	v
	41	-	-	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	13	-	-	v	v	-	-	v	v	v		v	v		v
	17	-	-	v	v	-	-	v	v	v		v	v		v
	25	v	v	v	v	v	v	v	v	v		v	v		v
	26	v	v	v	v	v	-	v	v	v		v	v		v
	41	-	-	v	v	v	v	v	v	v		v	v		v

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	13	-	-	v	v	-	-	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v			v	v	v
Frequency Stability	13	-	-		v	-	-	v				v		v	
	17	-	-		v	-	-	v				v		v	
	25				v			v				v		v	
	26				v		-	v				v		v	
	41	-	-		v			v				v		v	
E.R.P / E.I.R.P	13	-	-	v	v	-	-	v	v	v			v	v	v
	17	-	-	v	v	-	-	v	v	v			v	v	v
	25	v	v	v	v	v	v	v	v	v			v	v	v
	26	v	v	v	v	v	-	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	13	Worst Case												v	
	25	Worst Case											v	v	v
	26	Worst Case											v	v	v
	41	Worst Case											v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All the radiated test cases were performed with Battery 1.														

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 13 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 17 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	23780	23790	23800
	Frequency	709	710	711
5	Channel	23755	23790	23825
	Frequency	706.5	710	713.5

LTE Band 25 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	26140	26340	26590
	Frequency	1860	1880	1905
15	Channel	26115	26340	26615
	Frequency	1857.5	1880	1907.5
10	Channel	26090	26340	26640
	Frequency	1855	1880	1910
5	Channel	26065	26340	26665
	Frequency	1852.5	1880	1912.5
3	Channel	26055	26340	26675
	Frequency	1851.5	1880	1913.5
1.4	Channel	26047	26340	26683
	Frequency	1850.7	1880	1914.3

LTE Band 26 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
15	Channel	26865	26915	26965
	Frequency	831.5	836.5	841.5
10	Channel	26840	26915	26990
	Frequency	829	836.5	844
5	Channel	26815	26915	27015
	Frequency	826.5	836.5	846.5
3	Channel	26805	26915	27025
	Frequency	825.5	836.5	847.5
1.4	Channel	26797	26915	27033
	Frequency	824.7	836.5	848.3

LTE Band 41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

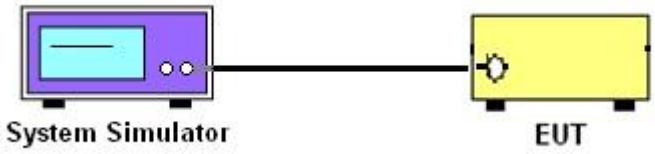
3 Conducted Test Items

3.1 Measuring Instruments

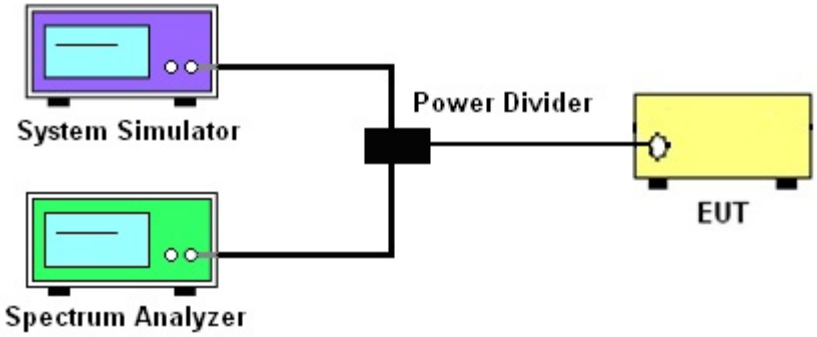
See list of measuring instruments of this test report.

3.1.1 Test Setup

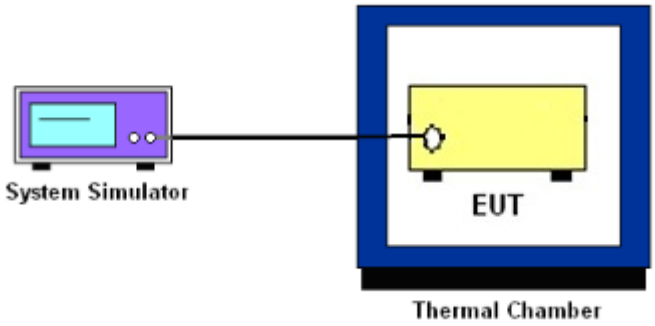
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and ERP/EIRP

3.2.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for Band 26.

The ERP of mobile transmitters must not exceed 3 Watts for Band 13 and Band 17.

The EIRP of mobile transmitters must not exceed 2 Watts for Band 25 and Band 41.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

3.3.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.1

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is 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 transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 4.2

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

22.917(a)

For operations in the 824 – 849 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(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 operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, 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.

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least 65 + 10 log10 p(watts), dB, for mobile and portable equipment.

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. 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.

27.53(m)(4)

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 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. 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.

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
8. For LTE Band 41, the other 40 dB, and 55 dB have additionally applied same calculation above.

3.6 Conducted Spurious Emission

3.6.1 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 Band 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^{th} harmonic.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
10. For Band 41

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

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

22.355

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 ±0.00025% (±2.5ppm) of the center frequency.

24.235 & 27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°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.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

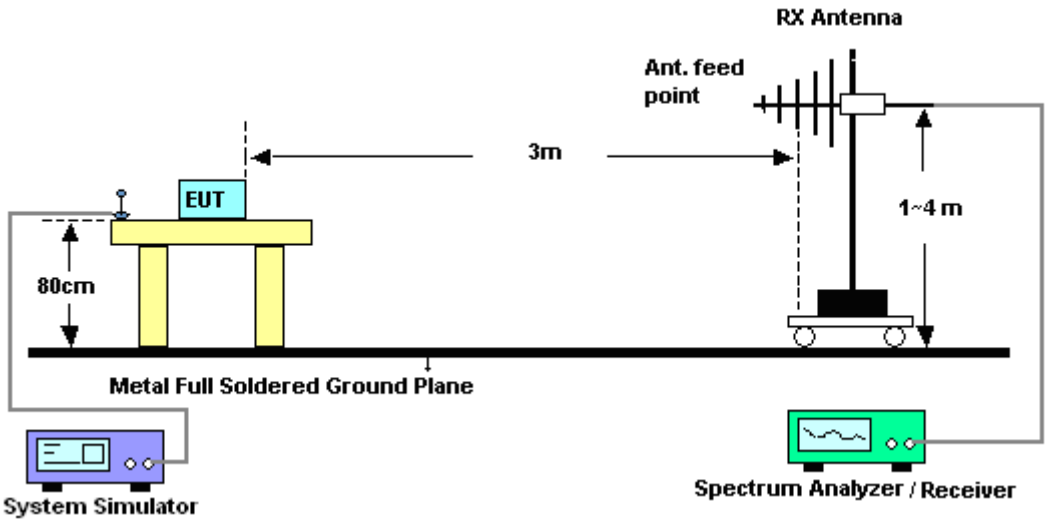
4 Radiated Test Items

4.1 Measuring Instruments

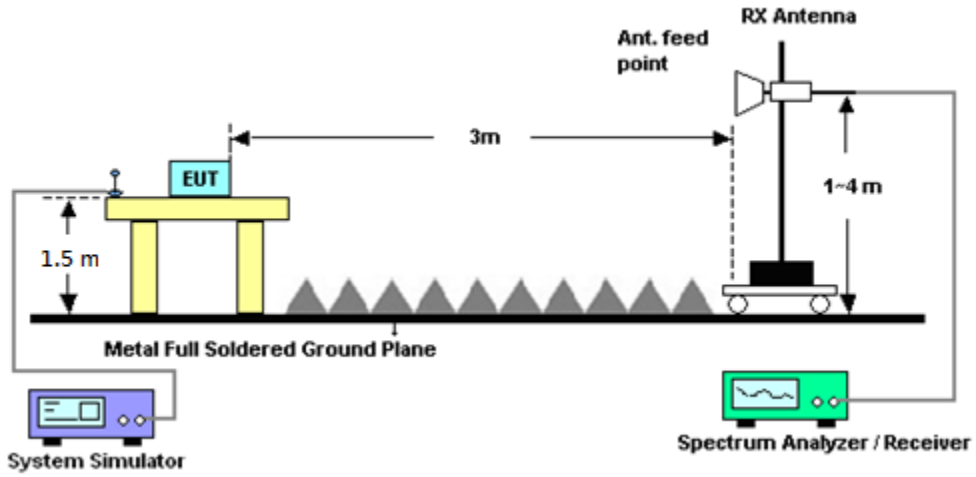
See list of measuring instruments of this test report.

4.1.1 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

4.2 Radiated Spurious Emission

4.2.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. 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 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 LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) 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 10th harmonic.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. 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.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
11. For Band 41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
    ERP (dBm) = EIRP - 2.15

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LTE Base Station	Anritsu	MT8820C	6201432821	GSM/GPRS /WCDMA/LTE	Oct. 13, 2017	Aug. 20, 2018~ Aug. 28, 2018	Oct. 12, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 07, 2017	Aug. 20, 2018~ Aug. 28, 2018	Nov. 06, 2018	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SU-241	92003713	-30℃~95℃	May 31, 2018	Aug. 20, 2018~ Aug. 28, 2018	May 30, 2019	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~5A	Oct. 06, 2017	Aug. 20, 2018~ Aug. 28, 2018	Oct. 05, 2018	Conducted (TH05-HY)
Coupler	Warison	1-18GHz 20dB 25WSMA Directional Coupler	#B	1G~18GHz	Dec. 04, 2017	Aug. 20, 2018~ Aug. 28, 2018	Dec. 03, 2018	Conducted (TH05-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 05, 2017	Aug. 15, 2018~ Aug. 16, 2018	Dec. 04, 2018	Radiation (03CH15-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Aug. 15, 2018~ Aug. 16, 2018	Nov. 22, 2018	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	May 08, 2018	Aug. 15, 2018~ Aug. 16, 2018	May 07, 2019	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 26, 2017	Aug. 15, 2018~ Aug. 16, 2018	Dec. 25, 2018	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Jan. 10, 2018	Aug. 15, 2018~ Aug. 16, 2018	Jan. 09, 2019	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1620	1G~18GHz	Oct. 03, 2017	Aug. 15, 2018~ Aug. 16, 2018	Oct. 02, 2018	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY53270195	1GHz~26.5GHz	Aug. 21, 2017	Aug. 15, 2018~ Aug. 16, 2018	Aug. 20, 2018	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY50180136	3Hz~44GHz	Apr. 25, 2018	Aug. 15, 2018~ Aug. 16, 2018	Apr. 24, 2019	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 15, 2018~ Aug. 16, 2018	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 15, 2018~ Aug. 16, 2018	N/A	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY57290111	3Hz~26.5GHz	Nov. 02, 2017	Aug. 15, 2018~ Aug. 16, 2018	Nov. 01, 2018	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz- 40GHz	Nov. 27, 2017	Aug. 15, 2018~ Aug. 16, 2018	Nov. 26, 2018	Radiation (03CH15-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 21, 2018	Aug. 15, 2018~ Aug. 16, 2018	May 20, 2019	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1G~18GHz	May 10, 2018	Aug. 15, 2018~ Aug. 16, 2018	May 09, 2019	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24 (K5)	ARD-SPR-000185	N/A	N/A	Aug. 15, 2018~ Aug. 16, 2018	N/A	Radiation (03CH15-HY)

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.37**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.67**

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.03**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	23.50	23.00	23.02
20	1	49		23.48	**23.68**	23.32
20	1	99		22.75	23.58	22.08
20	50	0		22.58	22.70	22.47
20	50	24		22.57	22.64	22.45
20	50	50		22.10	22.69	22.21
20	100	0		22.55	22.65	22.47
20	1	0	16-QAM	22.86	21.94	22.08
20	1	49		22.66	22.81	22.57
20	1	99		21.91	22.81	21.01
20	50	0		21.58	21.69	21.49
20	50	24		21.55	21.67	21.47
20	50	50		21.16	21.69	21.26
20	100	0		21.56	21.61	21.41
15	1	0	QPSK	23.55	23.04	23.25
15	1	37		23.40	23.49	23.26
15	1	74		22.96	23.60	22.06
15	36	0		22.52	22.65	22.43
15	36	20		22.53	22.60	22.44
15	36	39		22.52	22.65	21.88
15	75	0		22.51	22.63	22.43
15	1	0	16-QAM	22.82	22.29	22.49
15	1	37		22.67	22.77	22.53
15	1	74		22.14	22.88	21.01
15	36	0		21.54	21.68	21.46
15	36	20		21.49	21.64	21.41
15	36	39		21.49	21.68	20.62
15	75	0		21.51	21.61	21.46

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	23.52	23.42	23.41
10	1	25		23.40	23.54	22.20
10	1	49		23.47	23.62	22.10
10	25	0		22.49	22.62	22.47
10	25	12		22.50	22.60	21.65
10	25	25		22.49	22.67	21.55
10	50	0		22.47	22.59	21.97
10	1	0	16-QAM	22.73	22.66	22.65
10	1	25		22.68	22.80	21.49
10	1	49		22.67	22.89	21.38
10	25	0		21.49	21.62	21.40
10	25	12		21.47	21.61	20.75
10	25	25		21.46	21.66	20.05
10	50	0		21.50	21.62	21.04
5	1	0	QPSK	23.49	23.62	22.16
5	1	12		23.38	23.55	22.09
5	1	24		23.41	23.64	22.05
5	12	0		22.45	22.58	21.01
5	12	7		22.47	22.62	21.35
5	12	13		22.46	22.66	21.41
5	25	0		22.43	22.57	21.48
5	1	0	16-QAM	22.69	22.80	21.39
5	1	12		22.68	22.80	21.37
5	1	24		22.67	22.90	21.07
5	12	0		21.48	21.60	20.10
5	12	7		21.48	21.62	20.42
5	12	13		21.44	21.69	20.45
5	25	0		21.44	21.58	20.02

LTE Band 25 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	23.43	23.55	22.16
3	1	8		23.41	23.53	22.18
3	1	14		23.37	23.62	22.30
3	8	0		22.43	22.57	21.25
3	8	4		22.47	22.59	21.37
3	8	7		22.40	22.55	21.41
3	15	0		22.43	22.56	21.34
3	1	0	16-QAM	22.67	22.75	21.38
3	1	8		22.66	22.78	21.42
3	1	14		22.64	22.86	21.58
3	8	0		21.50	21.63	20.35
3	8	4		21.52	21.65	20.39
3	8	7		21.49	21.61	20.47
3	15	0		21.45	21.59	20.42
1.4	1	0	QPSK	23.30	23.45	22.10
1.4	1	3		23.39	23.51	22.34
1.4	1	5		23.30	23.43	22.18
1.4	3	0		23.40	23.50	22.18
1.4	3	1		23.42	23.55	22.24
1.4	3	3		23.38	23.52	22.26
1.4	6	0		22.38	22.51	21.28
1.4	1	0	16-QAM	22.59	22.69	21.30
1.4	1	3		22.65	22.78	21.51
1.4	1	5		22.56	22.71	21.43
1.4	3	0		22.37	22.50	21.19
1.4	3	1		22.42	22.54	21.24
1.4	3	3		22.33	22.49	21.27
1.4	6	0		21.43	21.57	20.36

LTE Band 13 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	-	**22.84**	-
10	1	25			22.69	
10	1	49			22.60	
10	25	0			21.76	
10	25	12			21.75	
10	25	25			21.70	
10	50	0			21.74	
10	1	0	16-QAM		21.83	
10	1	25			21.94	
10	1	49			21.87	
10	25	0			20.75	
10	25	12			20.77	
10	25	25			20.69	
10	50	0			20.76	
5	1	0	QPSK	22.59	22.81	22.81
5	1	12		22.79	22.75	22.83
5	1	24		22.70	22.74	22.79
5	12	0		21.95	21.81	21.87
5	12	7		21.95	21.80	21.90
5	12	13		21.93	21.76	21.87
5	25	0		21.91	21.81	21.86
5	1	0	16-QAM	21.88	22.05	22.11
5	1	12		22.13	22.01	22.10
5	1	24		22.13	21.99	22.05
5	12	0		20.97	20.86	20.88
5	12	7		21.00	20.85	20.92
5	12	13		20.95	20.79	20.85
5	25	0		20.92	20.81	20.88

LTE Band 17 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	**23.52**	23.48	23.46
10	1	25		23.46	23.43	23.43
10	1	49		23.50	23.47	23.45
10	25	0		22.56	22.54	22.55
10	25	12		22.54	22.52	22.52
10	25	25		22.55	22.53	22.54
10	50	0		22.55	22.53	22.51
10	1	0	16-QAM	22.73	22.72	22.70
10	1	25		22.76	22.74	22.73
10	1	49		22.72	22.68	22.64
10	25	0		21.55	21.52	21.52
10	25	12		21.56	21.54	21.53
10	25	25		21.52	21.51	21.49
10	50	0		21.55	21.56	21.55
5	1	0	QPSK	23.51	23.47	23.40
5	1	12		23.49	23.44	23.38
5	1	24		23.50	23.45	23.36
5	12	0		22.52	22.49	22.45
5	12	7		22.57	22.52	22.45
5	12	13		22.55	22.49	22.43
5	25	0		22.54	22.48	22.49
5	1	0	16-QAM	22.74	22.71	22.69
5	1	12		22.72	22.72	22.65
5	1	24		22.76	22.71	22.59
5	12	0		21.54	21.53	21.45
5	12	7		21.58	21.55	21.45
5	12	13		21.59	21.49	21.44
5	25	0		21.55	21.52	21.45

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	**23.77**	23.52	23.56
15	1	37		23.51	23.46	23.49
15	1	74		23.46	23.49	23.43
15	36	0		22.60	22.66	22.62
15	36	20		22.58	22.56	22.61
15	36	39		22.53	22.59	22.53
15	75	0		22.59	22.54	22.57
15	1	0	16-QAM	22.84	22.80	22.73
15	1	37		22.78	22.73	22.81
15	1	74		22.71	22.77	22.70
15	36	0		21.60	21.54	21.46
15	36	20		21.60	21.54	21.59
15	36	39		21.51	21.59	21.53
15	75	0		21.56	21.52	21.57
10	1	0	QPSK	23.70	23.67	23.63
10	1	25		23.66	23.61	23.58
10	1	49		23.74	23.62	23.57
10	25	0		22.72	22.68	22.64
10	25	12		22.74	22.67	22.65
10	25	25		22.70	22.65	22.61
10	50	0		22.70	22.66	22.65
10	1	0	16-QAM	22.92	22.96	22.91
10	1	25		22.91	22.89	22.83
10	1	49		22.99	22.88	22.80
10	25	0		21.70	21.68	21.63
10	25	12		21.72	21.67	21.64
10	25	25		21.67	21.63	21.61
10	50	0		21.72	21.67	21.64

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.64	23.53	23.49
5	1	12		23.58	23.51	23.46
5	1	24		23.58	23.52	23.46
5	12	0		22.61	22.53	22.48
5	12	7		22.64	22.55	22.50
5	12	13		22.61	22.56	22.48
5	25	0		22.62	22.52	22.50
5	1	0	16-QAM	22.83	22.80	22.71
5	1	12		22.82	22.82	22.71
5	1	24		22.82	22.78	22.68
5	12	0		21.62	21.55	21.50
5	12	7		21.65	21.56	21.52
5	12	13		21.61	21.55	21.50
5	25	0		21.60	21.53	21.49
3	1	0	QPSK	23.70	23.63	23.57
3	1	8		23.68	23.60	23.57
3	1	14		23.69	23.59	23.53
3	8	0		22.70	22.64	22.60
3	8	4		22.71	22.64	22.63
3	8	7		22.67	22.61	22.59
3	15	0		22.72	22.66	22.58
3	1	0	16-QAM	22.91	22.89	22.80
3	1	8		22.91	22.88	22.78
3	1	14		22.93	22.87	22.75
3	8	0		21.77	21.69	21.62
3	8	4		21.78	21.72	21.66
3	8	7		21.74	21.67	21.64
3	15	0		21.73	21.66	21.61

LTE Band 26 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.30	23.24	23.15
1.4	1	3		23.37	23.31	23.21
1.4	1	5		23.30	23.24	23.11
1.4	3	0		23.37	23.28	23.20
1.4	3	1		23.43	23.32	23.24
1.4	3	3		23.37	23.29	23.21
1.4	6	0		22.35	22.28	22.22
1.4	1	0	16-QAM	22.55	22.51	22.40
1.4	1	3		22.63	22.57	22.47
1.4	1	5		22.57	22.50	22.40
1.4	3	0		22.35	22.31	22.20
1.4	3	1		22.39	22.33	22.23
1.4	3	3		22.33	22.27	22.20
1.4	6	0		21.42	21.34	21.28

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	23.68	23.76	23.64
20	1	49		23.67	23.75	23.53
20	1	99		23.45	23.76	23.45
20	50	0		22.58	22.75	22.54
20	50	24		22.68	22.90	22.63
20	50	50		22.66	22.89	22.42
20	100	0		22.42	22.67	22.55
20	1	0	16-QAM	22.20	22.80	22.97
20	1	49		22.67	22.73	22.66
20	1	99		22.81	22.78	22.48
20	50	0		21.74	21.81	21.59
20	50	24		21.70	21.74	21.63
20	50	50		21.76	21.85	21.58
20	100	0		21.59	21.70	21.54
15	1	0	QPSK	23.24	23.75	23.52
15	1	37		23.58	23.77	23.55
15	1	74		23.50	23.83	23.39
15	36	0		22.64	22.86	22.81
15	36	20		22.78	22.76	22.70
15	36	39		22.67	22.82	22.49
15	75	0		22.45	22.78	22.54
15	1	0	16-QAM	22.23	22.89	22.67
15	1	37		22.76	23.00	22.78
15	1	74		22.84	22.95	22.51
15	36	0		21.77	21.78	21.63
15	36	20		21.84	21.80	21.46
15	36	39		21.66	21.93	21.55
15	75	0		21.68	21.83	21.63

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	23.27	23.69	23.59
10	1	25		23.69	23.71	23.65
10	1	49		23.66	**23.84**	23.47
10	25	0		22.67	22.77	22.63
10	25	12		22.80	22.75	22.60
10	25	25		22.71	22.89	22.68
10	50	0		22.50	22.75	22.67
10	1	0	16-QAM	22.40	22.81	22.62
10	1	25		22.67	22.89	22.50
10	1	49		22.77	22.86	22.45
10	25	0		21.89	21.71	21.62
10	25	12		21.81	21.82	21.75
10	25	25		21.77	21.69	21.64
10	50	0		21.68	21.75	21.61
5	1	0	QPSK	23.65	23.78	23.59
5	1	12		23.72	23.83	23.56
5	1	24		23.60	23.68	23.47
5	12	0		22.79	22.77	22.64
5	12	7		22.76	22.81	22.69
5	12	13		22.76	22.86	22.60
5	25	0		22.80	22.82	22.61
5	1	0	16-QAM	22.57	22.82	22.67
5	1	12		22.87	22.87	22.68
5	1	24		22.73	22.81	22.48
5	12	0		21.75	21.79	21.55
5	12	7		21.74	21.77	21.55
5	12	13		21.73	21.87	21.57
5	25	0		21.73	21.82	21.59

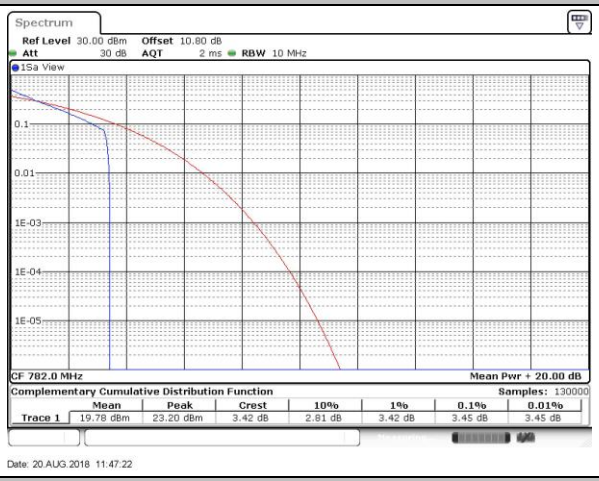
LTE Band 13

Peak-to-Average Ratio

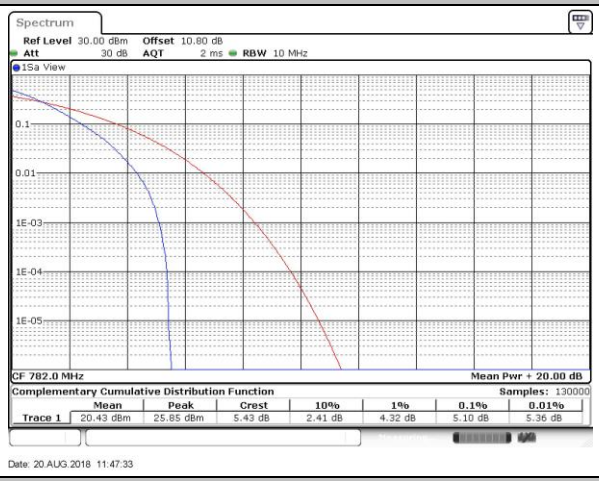
Mode	LTE Band 13 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	-	-	-	-	PASS
Middle CH	3.45	5.1	4.09	6.12	
Highest CH	-	-	-	-	

LTE Band 13 / 10MHz / QPSK

Middle Channel/ 1RB

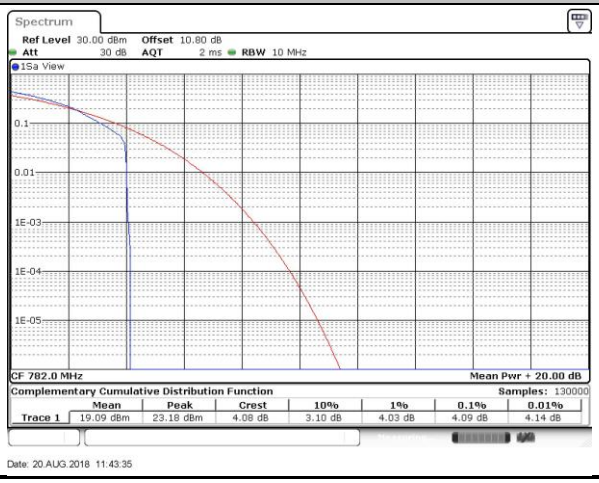


Middle Channel / Full RB

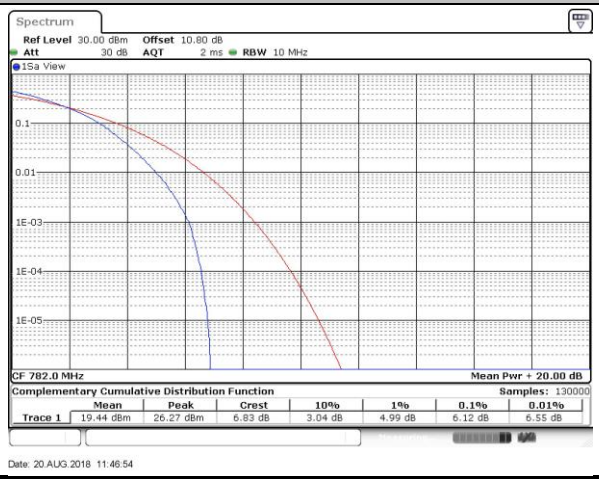


LTE Band 13 / 10MHz / 16QAM

Middle Channel/ 1RB



Middle Channel / Full RB

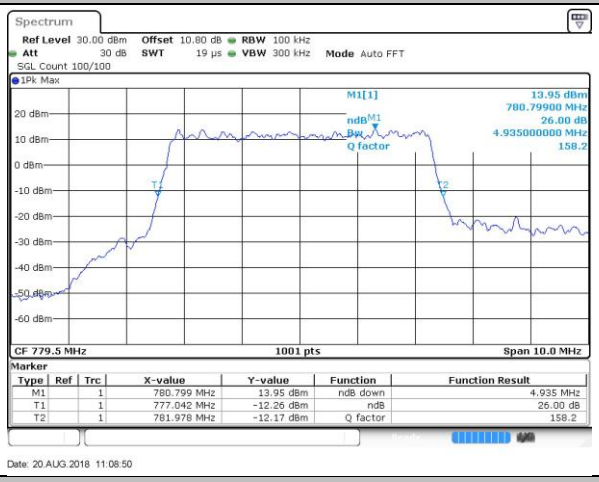


26dB Bandwidth

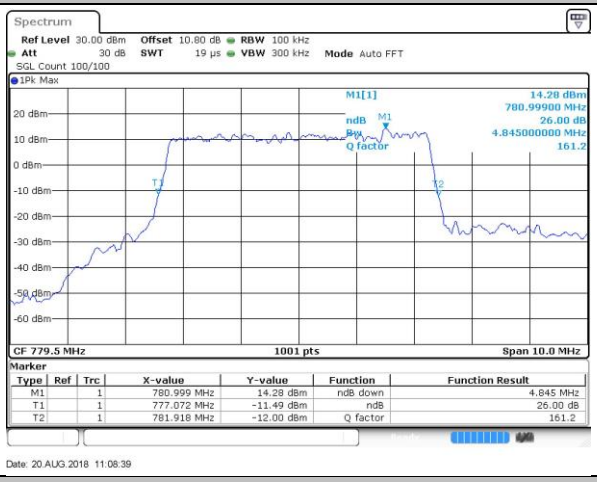
Mode	LTE Band 13 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.94	4.85	-	-	-	-	-	-
Middle CH	-	-	-	-	4.87	4.92	9.73	9.59	-	-	-	-
Highest CH	-	-	-	-	4.90	4.84	-	-	-	-	-	-

LTE Band 13

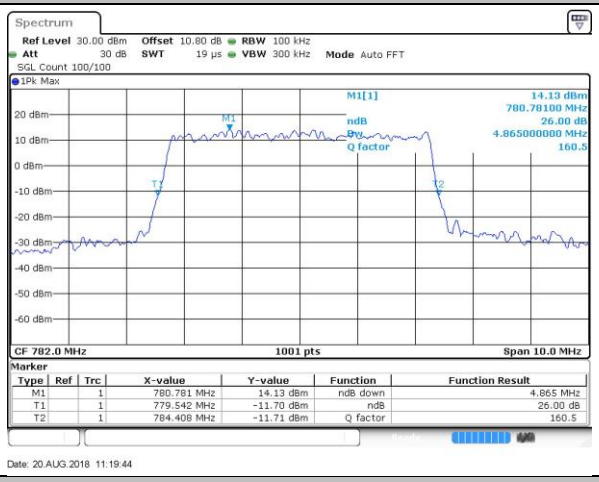
Lowest Channel / 5MHz / QPSK



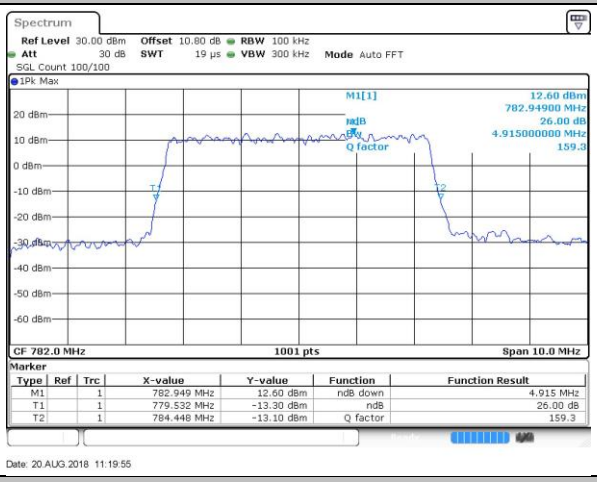
Lowest Channel / 5MHz / 16QAM



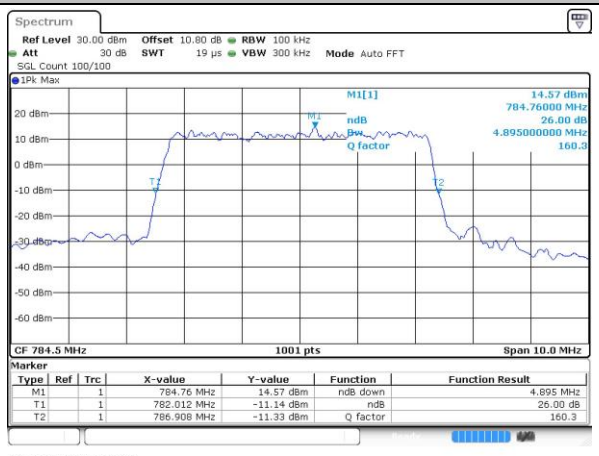
Middle Channel / 5MHz / QPSK



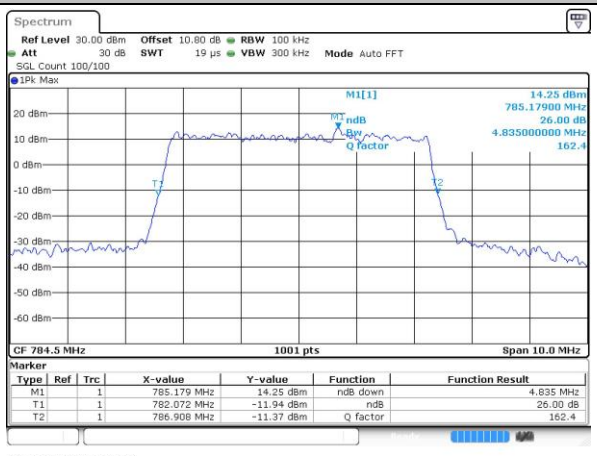
Middle Channel / 5MHz / 16QAM

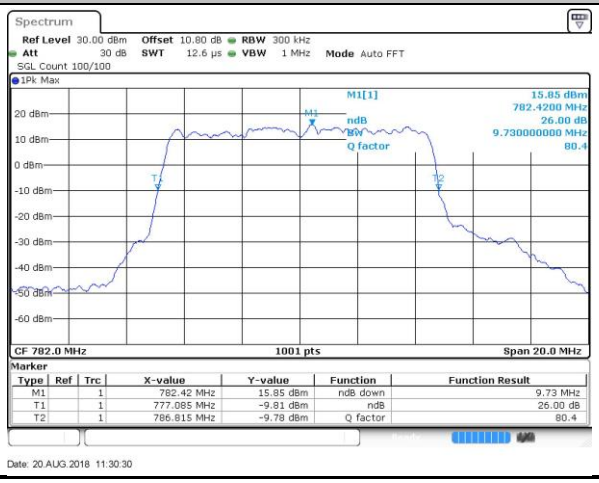
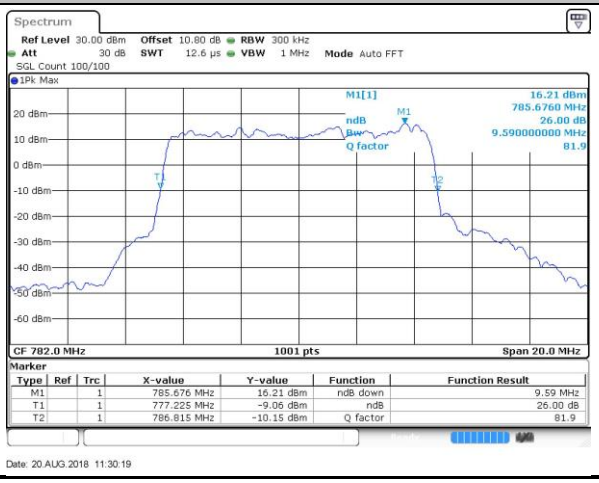


Highest Channel / 5MHz / QPSK



Highest Channel / 5MHz / 16QAM



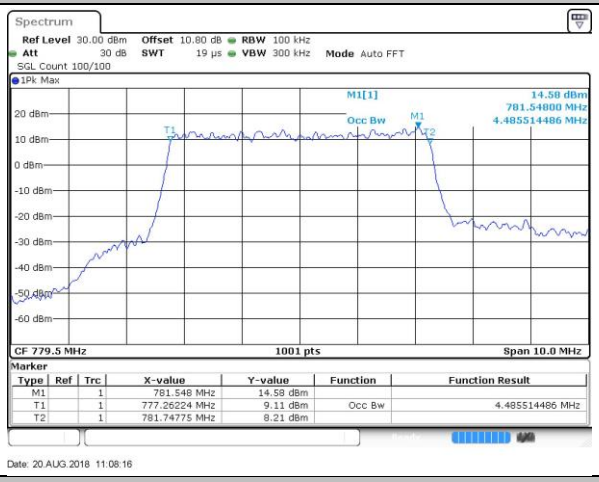
LTE Band 13	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

Occupied Bandwidth

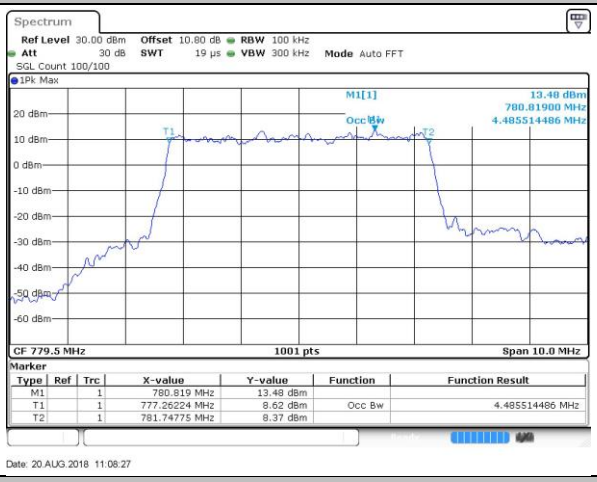
Mode	LTE Band 13 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.49	4.49	-	-	-	-	-	-
Middle CH	-	-	-	-	4.50	4.49	9.07	9.05	-	-	-	-
Highest CH	-	-	-	-	4.50	4.50	-	-	-	-	-	-

LTE Band 13

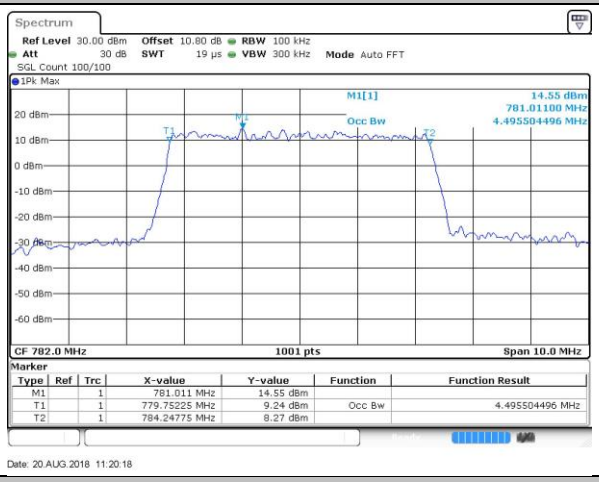
Lowest Channel / 5MHz / QPSK



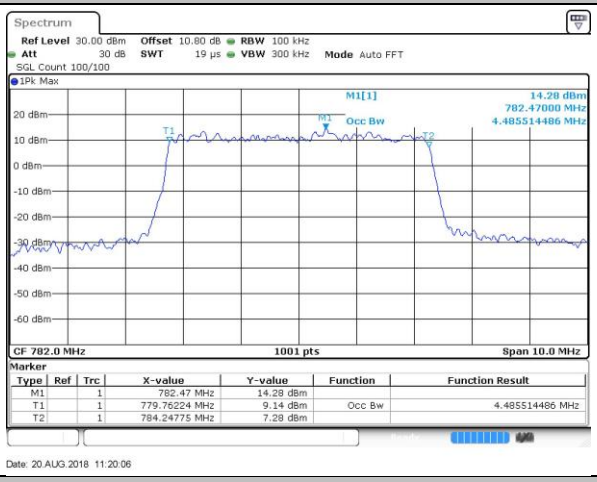
Lowest Channel / 5MHz / 16QAM



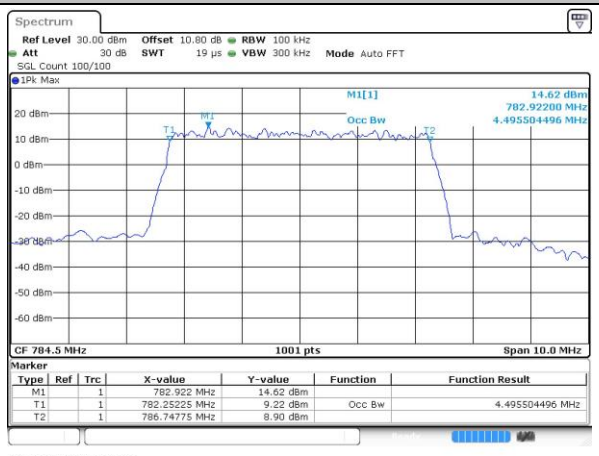
Middle Channel / 5MHz / QPSK



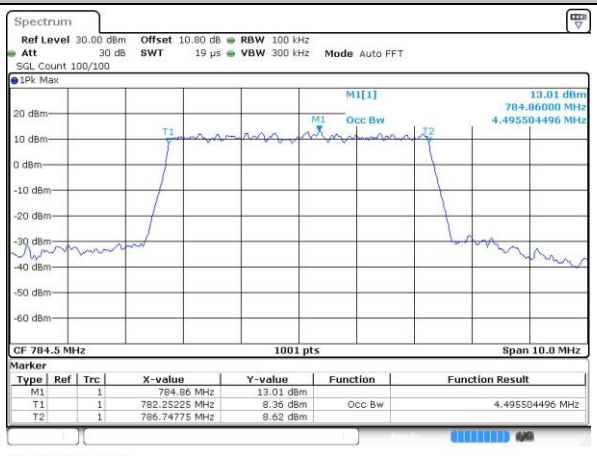
Middle Channel / 5MHz / 16QAM

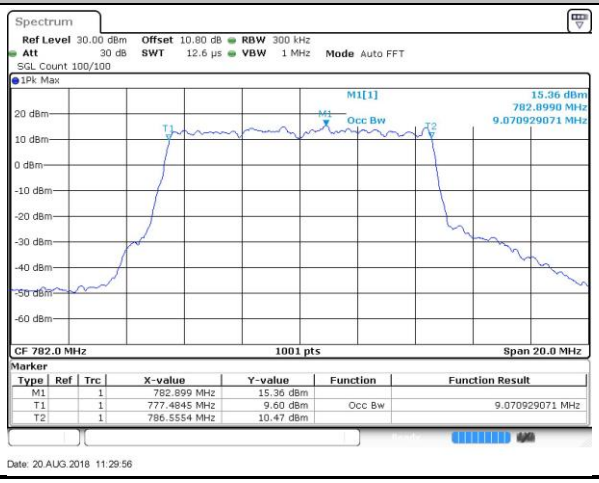
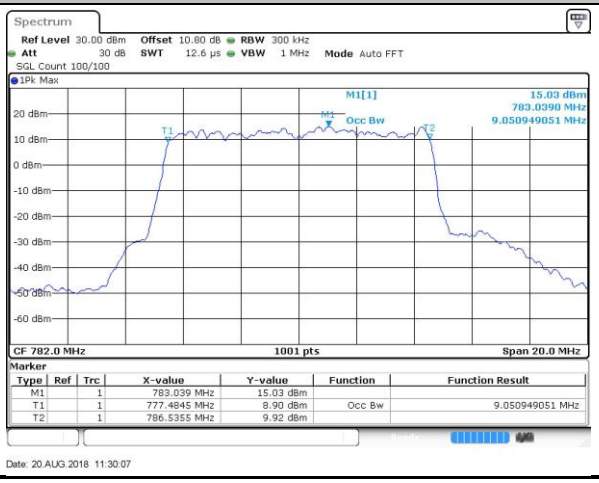


Highest Channel / 5MHz / QPSK



Highest Channel / 5MHz / 16QAM

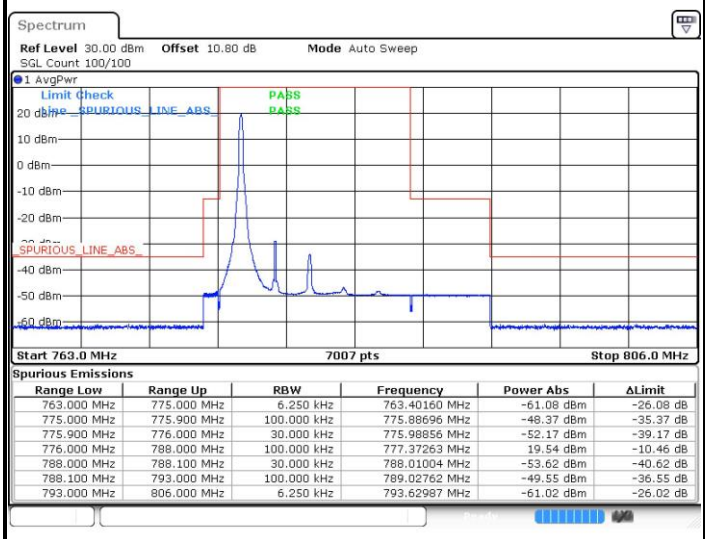


LTE Band 13	
Middle Channel / 10MHz / QPSK	**Middle Channel / 10MHz / 16QAM**
	

Conducted Band Edge

LTE Band 13 / 5MHz / QPSK

Lowest Band Edge / 1 RB

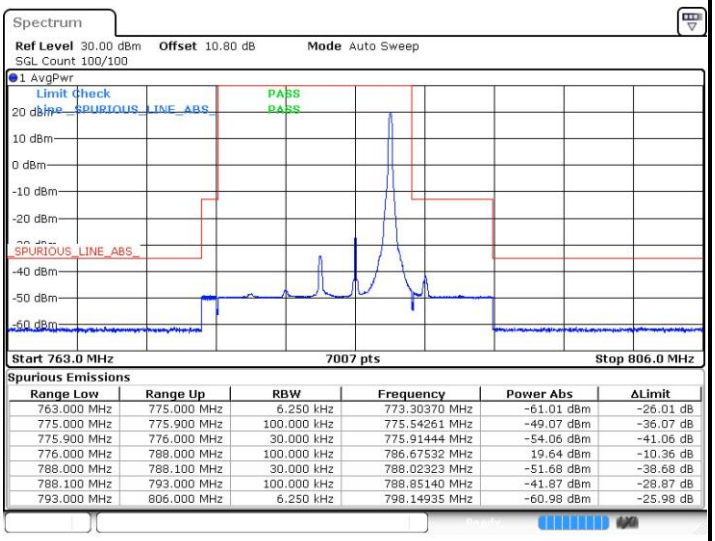


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	763.40160 MHz	-61.08 dBm	-26.08 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88696 MHz	-48.37 dBm	-35.37 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98856 MHz	-52.17 dBm	-39.17 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.37263 MHz	19.54 dBm	-10.46 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.01004 MHz	-53.62 dBm	-40.62 dB
788.100 MHz	793.000 MHz	100.000 kHz	789.02762 MHz	-49.55 dBm	-36.55 dB
793.000 MHz	806.000 MHz	6.250 kHz	793.62987 MHz	-61.02 dBm	-26.02 dB

Date: 20.AUG.2018 11:15:31

Highest Band Edge / 1 RB

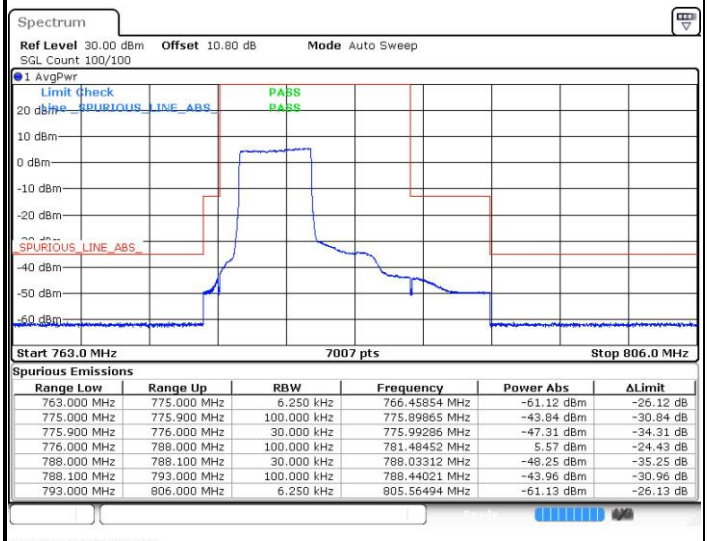


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	773.30370 MHz	-61.01 dBm	-26.01 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.54261 MHz	-49.07 dBm	-36.07 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.91444 MHz	-54.06 dBm	-41.06 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.67532 MHz	19.64 dBm	-10.36 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.02323 MHz	-51.68 dBm	-38.68 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.85140 MHz	-41.87 dBm	-28.87 dB
793.000 MHz	806.000 MHz	6.250 kHz	798.14935 MHz	-60.98 dBm	-25.98 dB

Date: 20.AUG.2018 11:27:44

Lowest Band Edge / Full RB

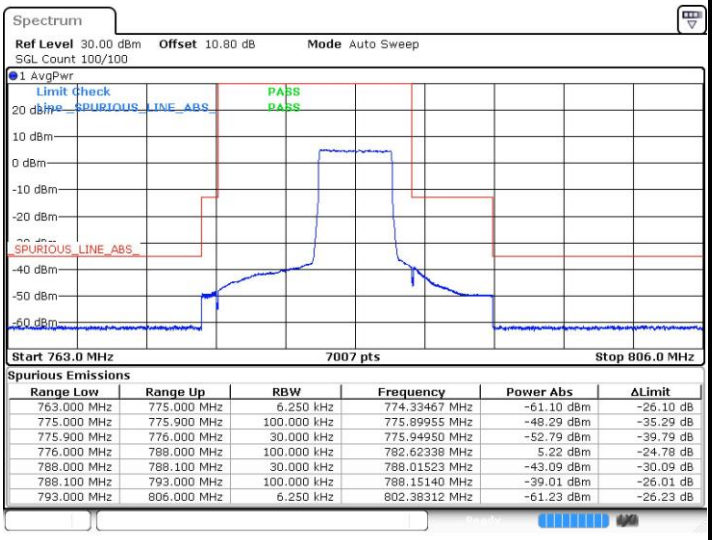


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	766.45854 MHz	-61.12 dBm	-26.12 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89865 MHz	-43.84 dBm	-30.84 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99286 MHz	-47.31 dBm	-34.31 dB
776.000 MHz	788.000 MHz	100.000 kHz	781.48452 MHz	5.57 dBm	-24.43 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.03312 MHz	-48.25 dBm	-35.25 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.44021 MHz	-43.96 dBm	-30.96 dB
793.000 MHz	806.000 MHz	6.250 kHz	805.56494 MHz	-61.13 dBm	-26.13 dB

Date: 20.AUG.2018 11:10:30

Highest Band Edge / Full RB



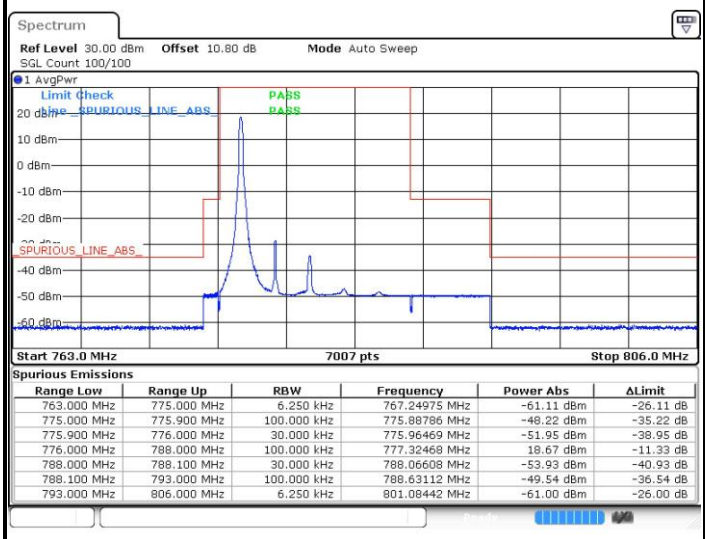
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	774.33467 MHz	-61.10 dBm	-26.10 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89955 MHz	-48.29 dBm	-35.29 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.94950 MHz	-52.79 dBm	-39.79 dB
776.000 MHz	788.000 MHz	100.000 kHz	782.62338 MHz	5.22 dBm	-24.78 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.01523 MHz	-43.09 dBm	-30.09 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.15140 MHz	-39.01 dBm	-26.01 dB
793.000 MHz	806.000 MHz	6.250 kHz	802.38312 MHz	-61.23 dBm	-26.23 dB

Date: 20.AUG.2018 11:22:43

LTE Band 13 / 5MHz / 16QAM

Lowest Band Edge /1 RB

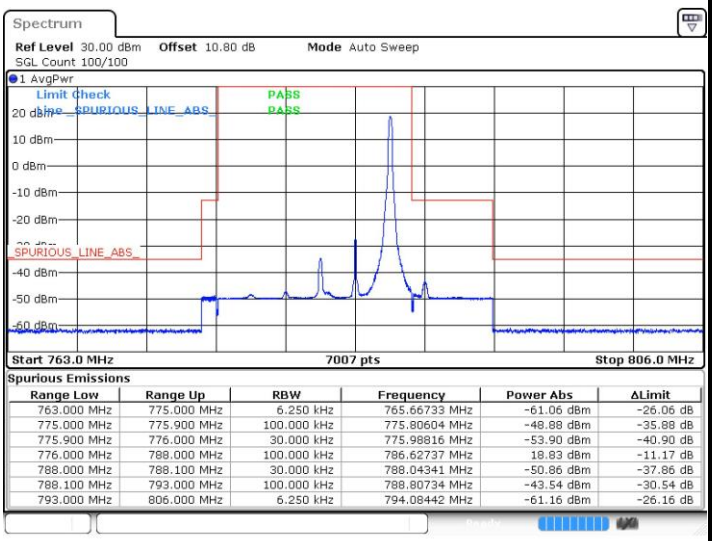


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	767.24975 MHz	-61.11 dBm	-26.11 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88786 MHz	-48.22 dBm	-35.22 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.96469 MHz	-51.95 dBm	-38.95 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.32468 MHz	18.67 dBm	-11.33 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.06608 MHz	-53.93 dBm	-40.93 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.63112 MHz	-49.54 dBm	-36.54 dB
793.000 MHz	806.000 MHz	6.250 kHz	801.08442 MHz	-61.00 dBm	-26.00 dB

Date: 20.AUG.2018 11:13:51

Highest Band Edge / 1 RB

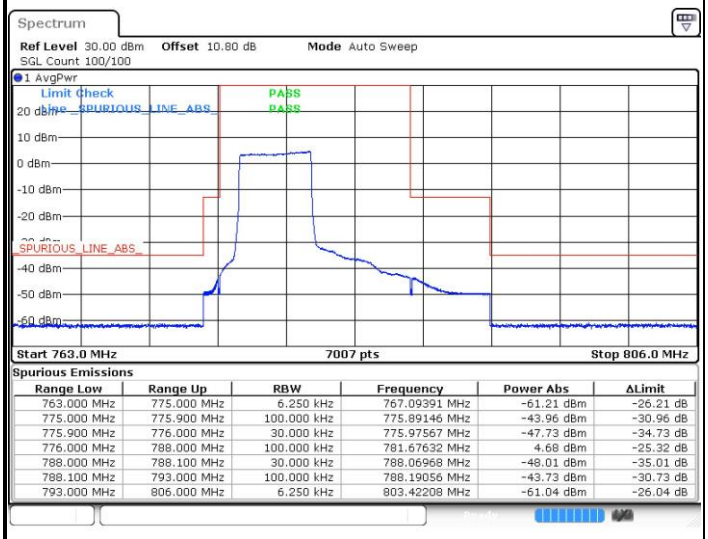


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	765.66733 MHz	-61.06 dBm	-26.06 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.80604 MHz	-48.88 dBm	-35.88 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98816 MHz	-53.90 dBm	-40.90 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.62737 MHz	18.83 dBm	-11.17 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04341 MHz	-50.86 dBm	-37.86 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.80734 MHz	-43.54 dBm	-30.54 dB
793.000 MHz	806.000 MHz	6.250 kHz	794.08442 MHz	-61.16 dBm	-26.16 dB

Date: 20.AUG.2018 11:26:04

Lowest Band Edge / Full RB

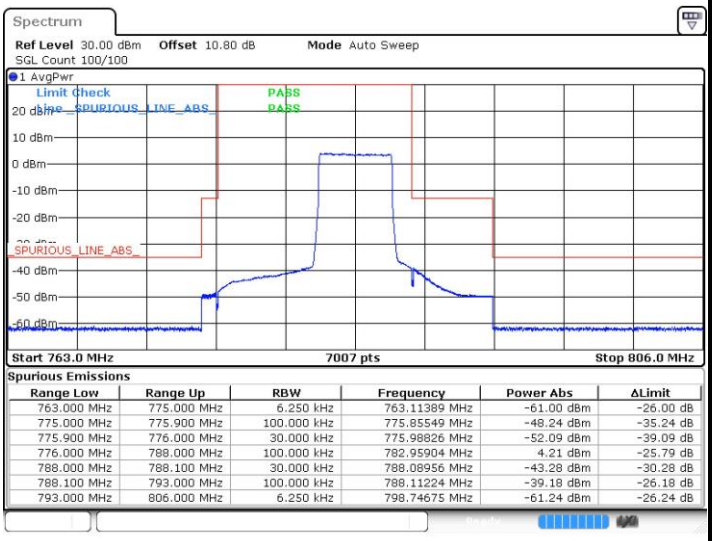


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	767.09391 MHz	-61.21 dBm	-26.21 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89146 MHz	-43.96 dBm	-30.96 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97567 MHz	-47.73 dBm	-34.73 dB
776.000 MHz	788.000 MHz	100.000 kHz	781.67632 MHz	4.68 dBm	-25.32 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.06968 MHz	-48.01 dBm	-35.01 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.19056 MHz	-43.73 dBm	-30.73 dB
793.000 MHz	806.000 MHz	6.250 kHz	803.42208 MHz	-61.04 dBm	-26.04 dB

Date: 20.AUG.2018 11:12:11

Highest Band Edge / Full RB



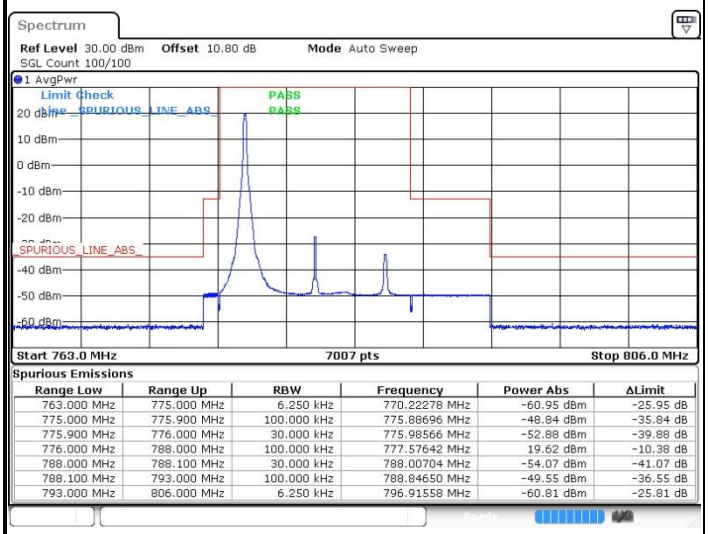
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	763.11389 MHz	-61.00 dBm	-26.00 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.85549 MHz	-48.24 dBm	-35.24 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98826 MHz	-52.09 dBm	-39.09 dB
776.000 MHz	788.000 MHz	100.000 kHz	782.95904 MHz	4.21 dBm	-25.79 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.08956 MHz	-43.28 dBm	-30.28 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.11224 MHz	-39.18 dBm	-26.18 dB
793.000 MHz	806.000 MHz	6.250 kHz	798.74675 MHz	-61.24 dBm	-26.24 dB

Date: 20.AUG.2018 11:24:23

LTE Band 13 / 10MHz / QPSK

Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	770.22278 MHz	-60.95 dBm	-25.95 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.88696 MHz	-48.84 dBm	-35.84 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98566 MHz	-52.88 dBm	-39.88 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.57642 MHz	19.62 dBm	-10.38 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.00704 MHz	-54.07 dBm	-41.07 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.84650 MHz	-49.55 dBm	-36.55 dB
793.000 MHz	806.000 MHz	6.250 kHz	796.91558 MHz	-60.81 dBm	-25.81 dB

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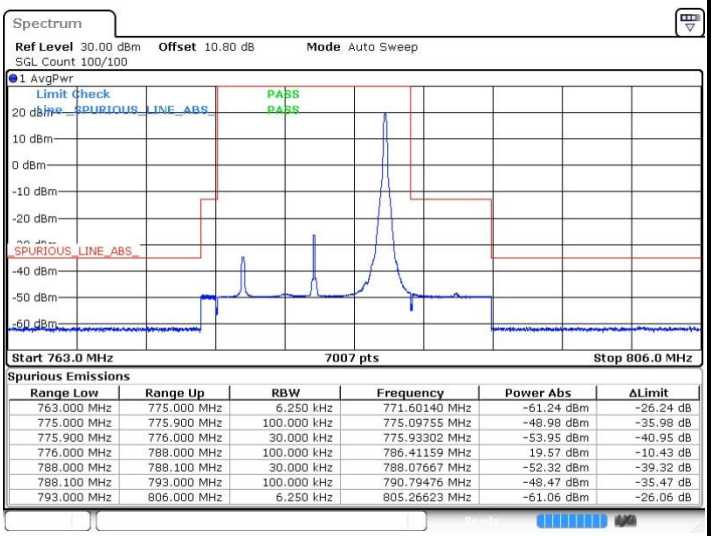
Highest Band Edge / 1 RB

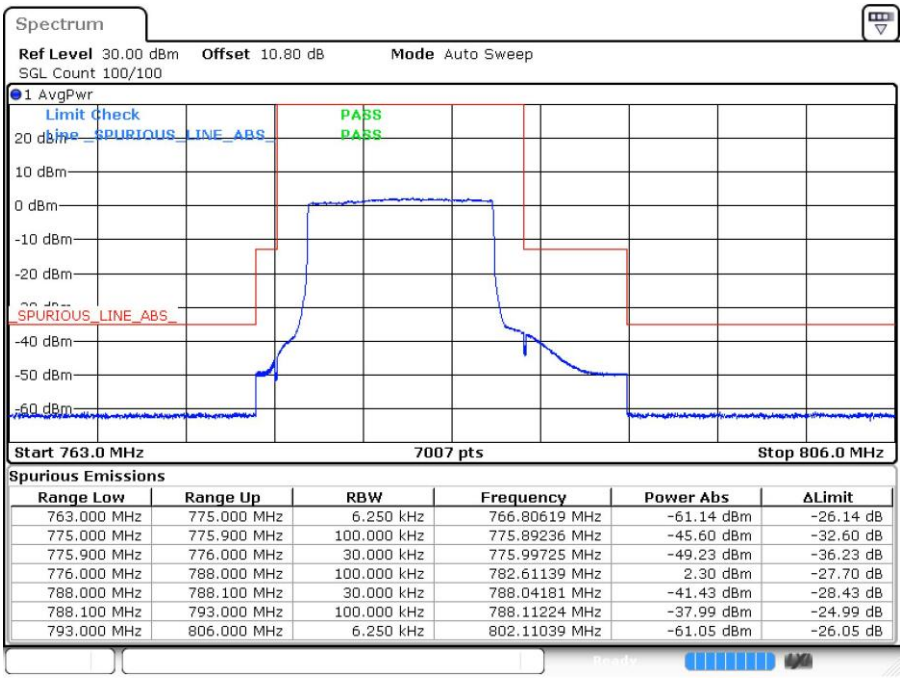


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	771.60140 MHz	-61.24 dBm	-26.24 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.09755 MHz	-48.98 dBm	-35.98 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.93302 MHz	-53.95 dBm	-40.95 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.41159 MHz	19.57 dBm	-10.43 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.07667 MHz	-52.32 dBm	-39.32 dB
788.100 MHz	793.000 MHz	100.000 kHz	790.79476 MHz	-48.47 dBm	-35.47 dB
793.000 MHz	806.000 MHz	6.250 kHz	805.26623 MHz	-61.06 dBm	-26.06 dB

Date: 20.AUG.2018 11:38:51

Band Edge / Full RB



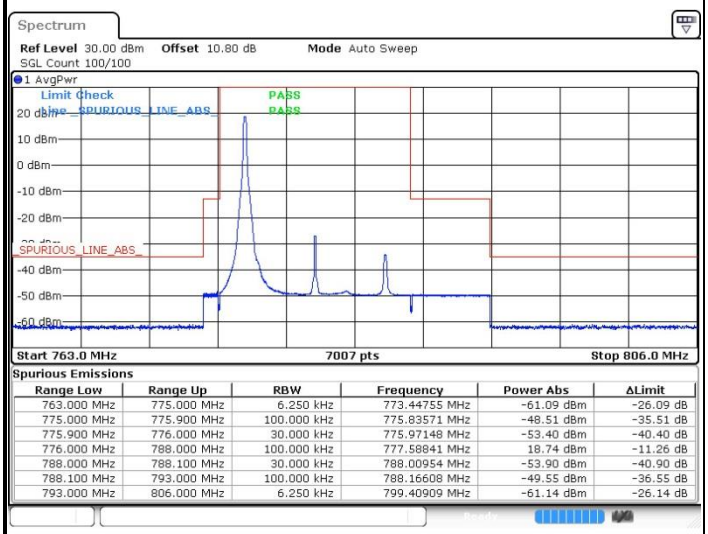
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	766.80619 MHz	-61.14 dBm	-26.14 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89236 MHz	-45.60 dBm	-32.60 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.99725 MHz	-49.23 dBm	-36.23 dB
776.000 MHz	788.000 MHz	100.000 kHz	782.61139 MHz	2.30 dBm	-27.70 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04181 MHz	-41.43 dBm	-28.43 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.11224 MHz	-37.99 dBm	-24.99 dB
793.000 MHz	806.000 MHz	6.250 kHz	802.11039 MHz	-61.05 dBm	-26.05 dB

Date: 20.AUG.2018 11:32:10

LTE Band 13 / 10MHz / 16QAM

Lowest Band Edge / 1 RB

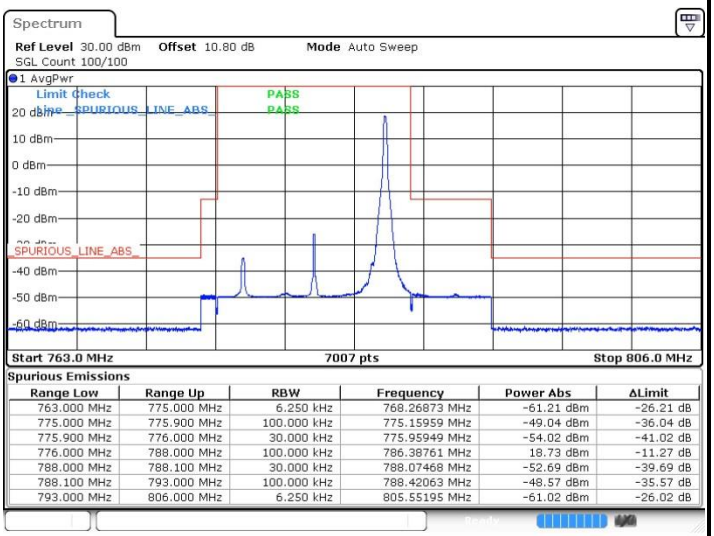


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	773.44755 MHz	-61.09 dBm	-26.09 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.83571 MHz	-48.51 dBm	-35.51 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.97148 MHz	-53.40 dBm	-40.40 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.58841 MHz	18.74 dBm	-11.26 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.00954 MHz	-53.90 dBm	-40.90 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.16608 MHz	-49.55 dBm	-36.55 dB
793.000 MHz	806.000 MHz	6.250 kHz	799.40909 MHz	-61.14 dBm	-26.14 dB

Date: 20.AUG.2018 11:35:30

Highest Band Edge / 1 RB

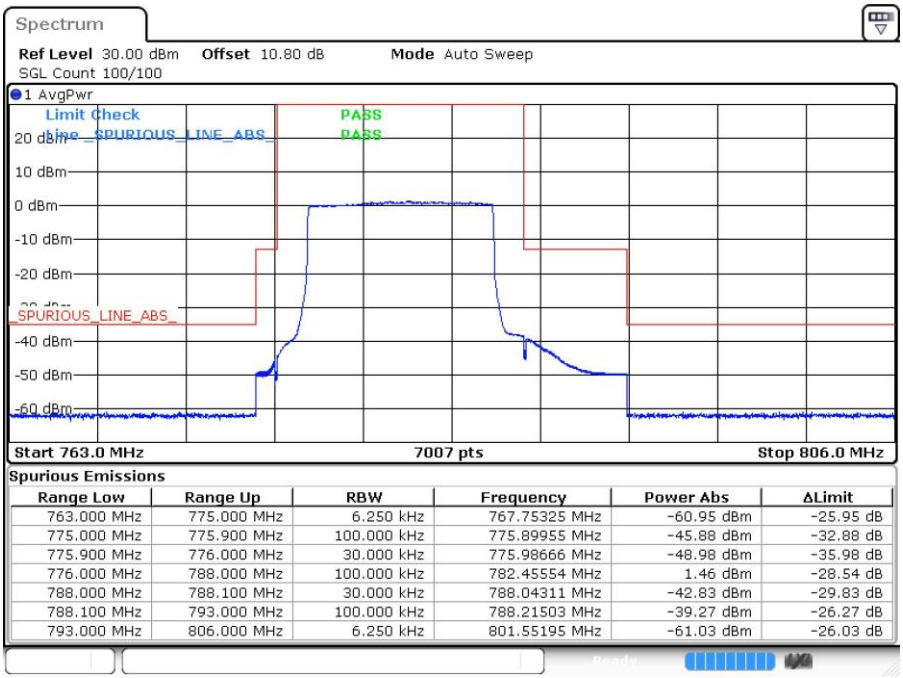


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	768.26873 MHz	-61.21 dBm	-26.21 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.15959 MHz	-49.04 dBm	-36.04 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.95949 MHz	-54.02 dBm	-41.02 dB
776.000 MHz	788.000 MHz	100.000 kHz	786.38761 MHz	18.73 dBm	-11.27 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.07468 MHz	-52.69 dBm	-39.69 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.42063 MHz	-48.57 dBm	-35.57 dB
793.000 MHz	806.000 MHz	6.250 kHz	805.55195 MHz	-61.02 dBm	-26.02 dB

Date: 20.AUG.2018 11:40:31

Band Edge / Full RB



Spurious Emissions

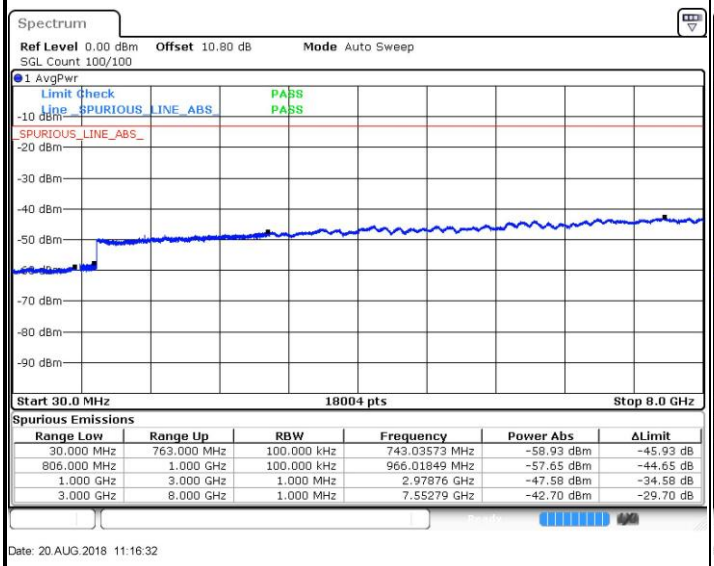
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
763.000 MHz	775.000 MHz	6.250 kHz	767.75325 MHz	-60.95 dBm	-25.95 dB
775.000 MHz	775.900 MHz	100.000 kHz	775.89955 MHz	-45.88 dBm	-32.88 dB
775.900 MHz	776.000 MHz	30.000 kHz	775.98666 MHz	-48.98 dBm	-35.98 dB
776.000 MHz	788.000 MHz	100.000 kHz	782.45554 MHz	1.46 dBm	-28.54 dB
788.000 MHz	788.100 MHz	30.000 kHz	788.04311 MHz	-42.83 dBm	-29.83 dB
788.100 MHz	793.000 MHz	100.000 kHz	788.21503 MHz	-39.27 dBm	-26.27 dB
793.000 MHz	806.000 MHz	6.250 kHz	801.55195 MHz	-61.03 dBm	-26.03 dB

Date: 20.AUG.2018 11:33:50

Conducted Spurious Emission

LTE Band 13 / 5MHz

Lowest Channel / QPSK

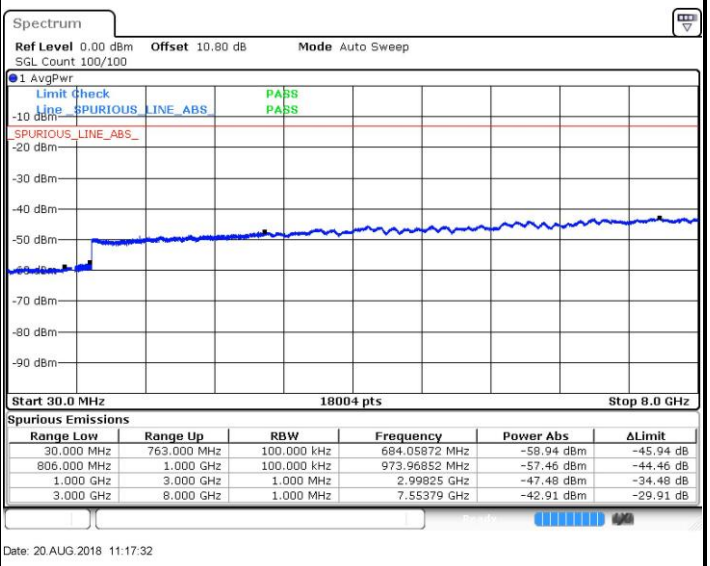


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	743.03573 MHz	-58.93 dBm	-45.93 dB
806.000 MHz	1.000 GHz	100.000 kHz	966.01849 MHz	-57.65 dBm	-44.65 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.97876 GHz	-47.58 dBm	-34.58 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55279 GHz	-42.70 dBm	-29.70 dB

Date: 20.AUG.2018 11:16:32

Lowest Channel / 16QAM

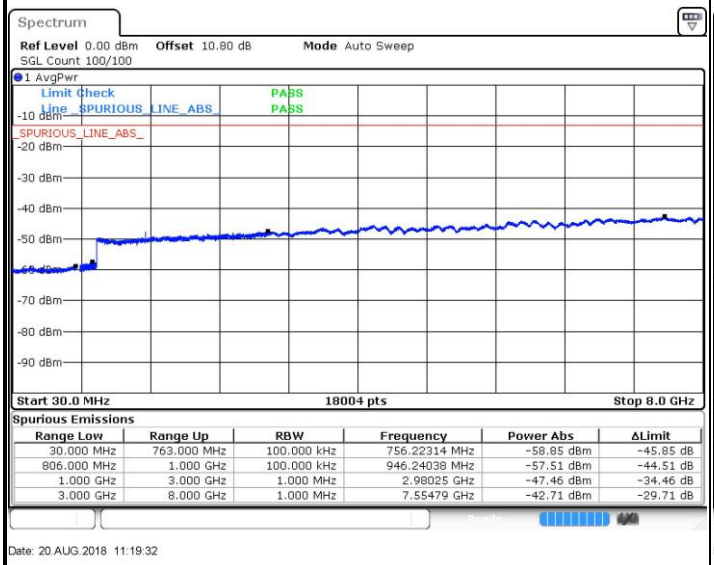


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	684.05872 MHz	-58.94 dBm	-45.94 dB
806.000 MHz	1.000 GHz	100.000 kHz	973.96852 MHz	-57.46 dBm	-44.46 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99825 GHz	-47.48 dBm	-34.48 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55379 GHz	-42.91 dBm	-29.91 dB

Date: 20.AUG.2018 11:17:32

Middle Channel / QPSK

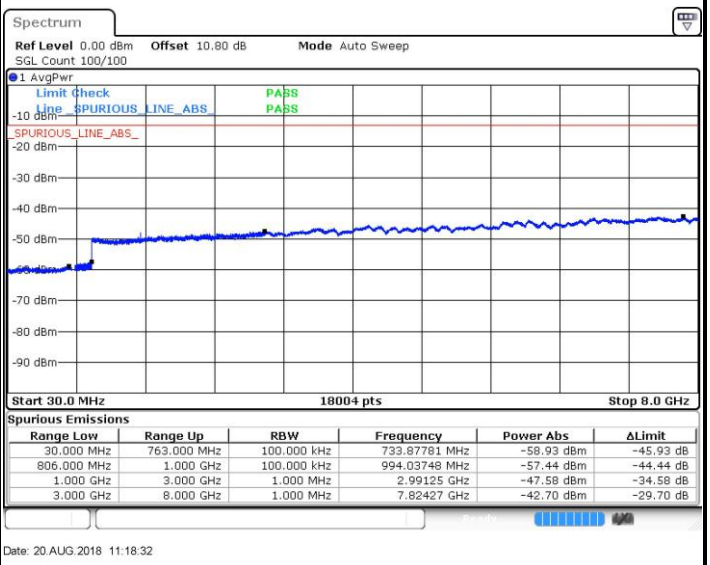


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	756.22314 MHz	-58.85 dBm	-45.85 dB
806.000 MHz	1.000 GHz	100.000 kHz	946.24038 MHz	-57.51 dBm	-44.51 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.98025 GHz	-47.46 dBm	-34.46 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55479 GHz	-42.71 dBm	-29.71 dB

Date: 20.AUG.2018 11:19:32

Middle Channel / 16QAM



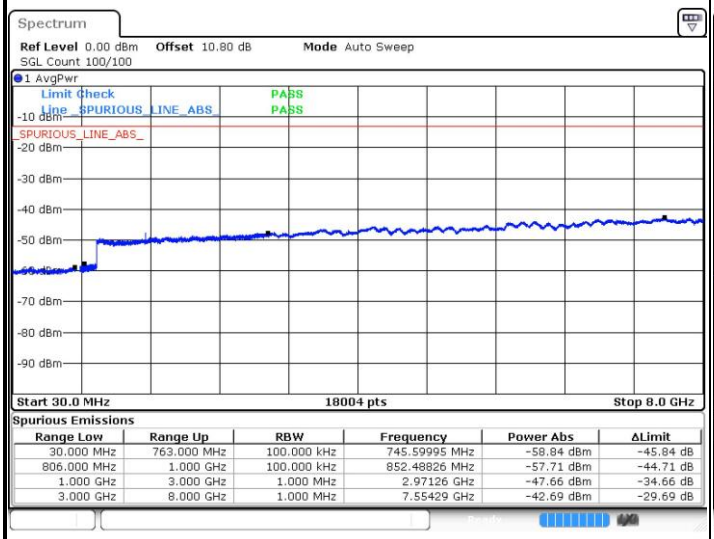
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	733.87781 MHz	-58.93 dBm	-45.93 dB
806.000 MHz	1.000 GHz	100.000 kHz	994.03748 MHz	-57.44 dBm	-44.44 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99125 GHz	-47.58 dBm	-34.58 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.82427 GHz	-42.70 dBm	-29.70 dB

Date: 20.AUG.2018 11:18:32

LTE Band 13 / 5MHz

Highest Channel / QPSK

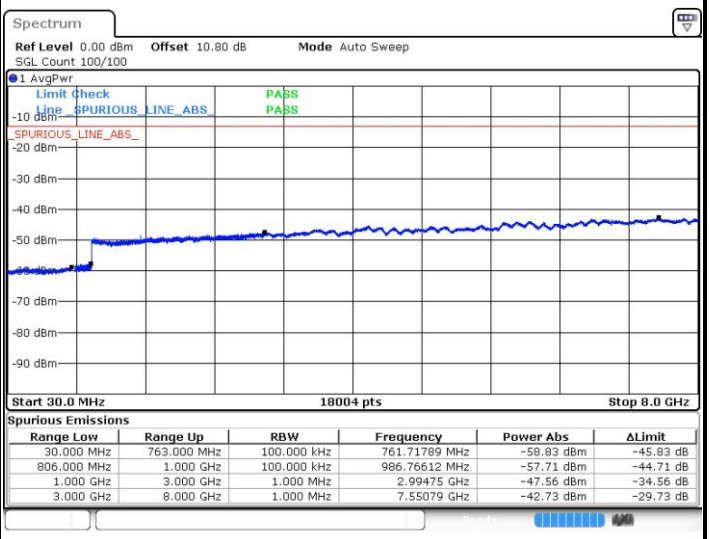


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	745.59995 MHz	-58.84 dBm	-45.84 dB
806.000 MHz	1.000 GHz	100.000 kHz	852.48826 MHz	-57.71 dBm	-44.71 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.97126 GHz	-47.66 dBm	-34.66 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55429 GHz	-42.69 dBm	-29.69 dB

Date: 20.AUG.2018 11:28:45

Highest Channel / 16QAM



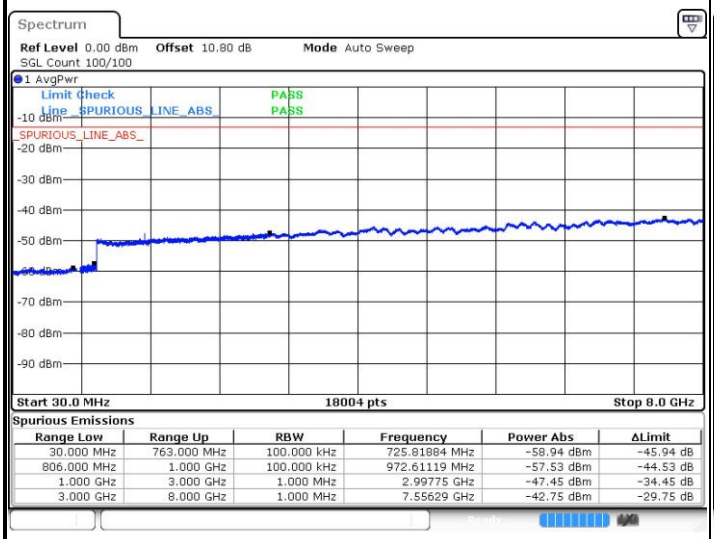
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	761.71789 MHz	-58.83 dBm	-45.83 dB
806.000 MHz	1.000 GHz	100.000 kHz	986.76612 MHz	-57.71 dBm	-44.71 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99475 GHz	-47.56 dBm	-34.56 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55079 GHz	-42.73 dBm	-29.73 dB

Date: 20.AUG.2018 11:29:45

LTE Band 13 / 10MHz

Middle Channel / QPSK

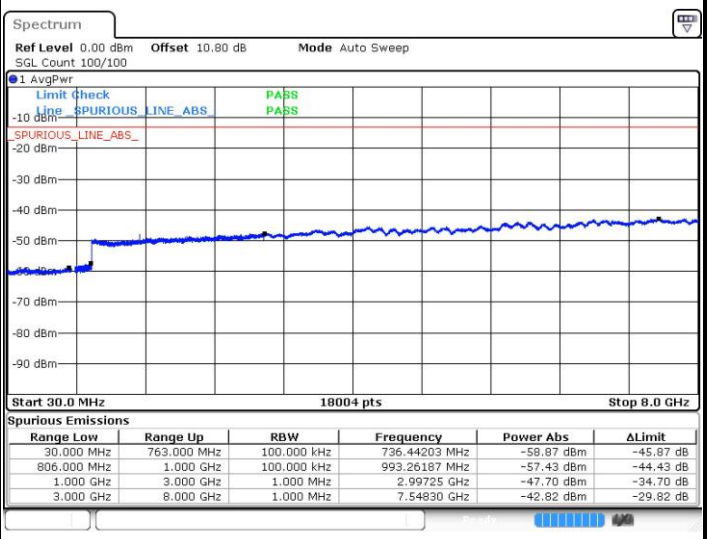


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	725.81884 MHz	-58.94 dBm	-45.94 dB
806.000 MHz	1.000 GHz	100.000 kHz	972.61119 MHz	-57.53 dBm	-44.53 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99775 GHz	-47.45 dBm	-34.45 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.55629 GHz	-42.75 dBm	-29.75 dB

Date: 20.AUG.2018 11:42:32

Middle Channel / 16QAM



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	736.44203 MHz	-58.87 dBm	-45.87 dB
806.000 MHz	1.000 GHz	100.000 kHz	993.26187 MHz	-57.43 dBm	-44.43 dB
1.000 GHz	3.000 GHz	1.000 MHz	2.99725 GHz	-47.70 dBm	-34.70 dB
3.000 GHz	8.000 GHz	1.000 MHz	7.54830 GHz	-42.82 dBm	-29.82 dB

Date: 20.AUG.2018 11:41:32

Frequency Stability

Test Conditions		LTE Band 13 (QPSK) / Middle Channel	Limit
Temperature (°C)	Voltage (Volt)	BW 10MHz	Note 2.
		Deviation (ppm)	Result
50	Normal Voltage	0.0014	PASS
40	Normal Voltage	0.0005	
30	Normal Voltage	0.0020	
20(Ref.)	Normal Voltage	0.0000	
10	Normal Voltage	0.0023	
0	Normal Voltage	0.0014	
-10	Normal Voltage	0.0020	
-20	Normal Voltage	0.0001	
-30	Normal Voltage	0.0009	
20	Maximum Voltage	0.0006	
20	Normal Voltage	0.0000	
20	Battery End Point	0.0010	

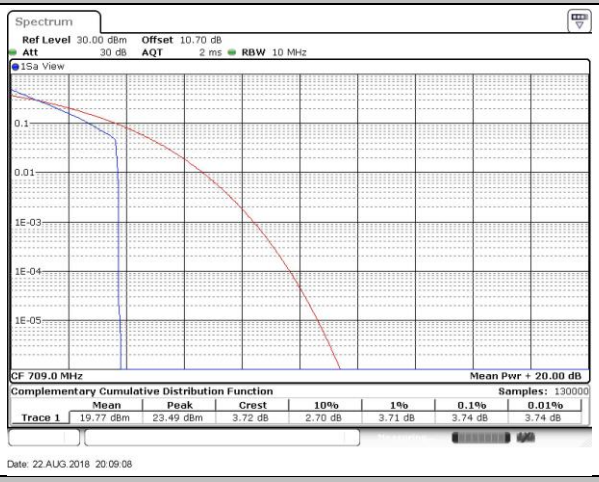
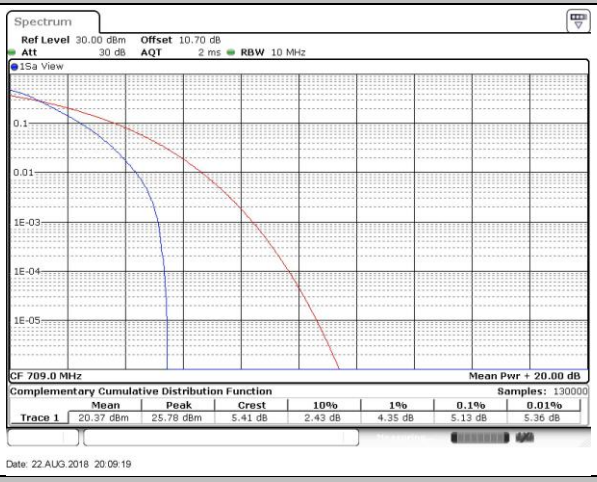
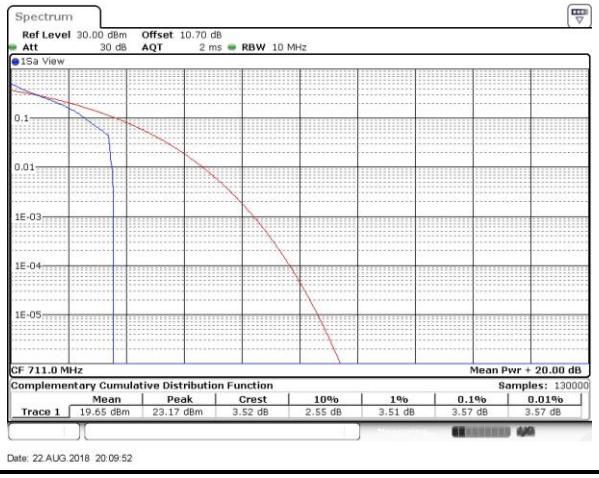
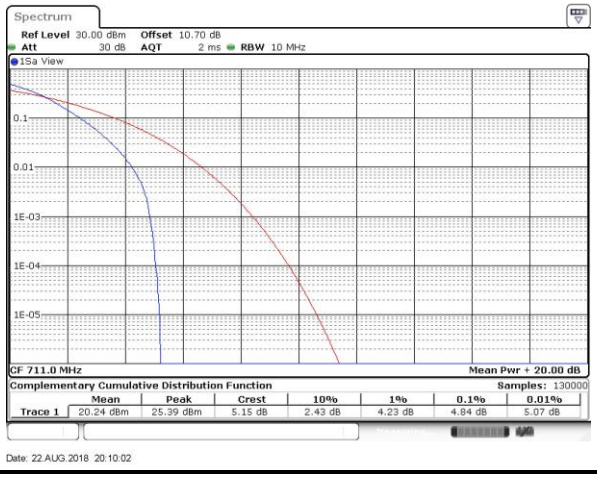
Note:

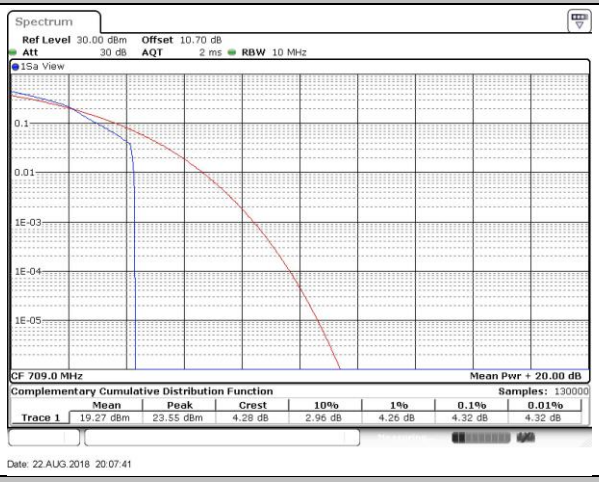
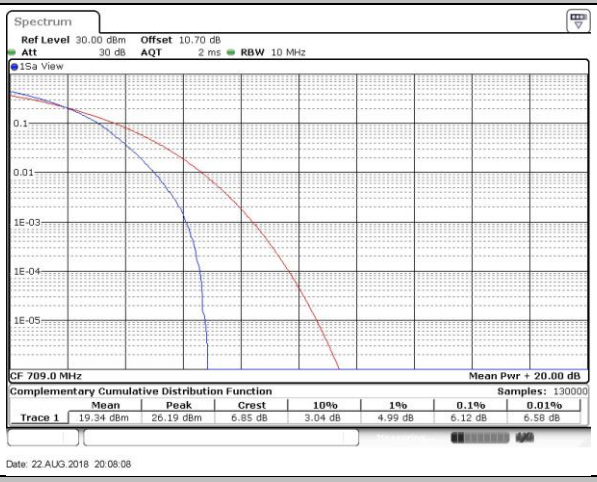
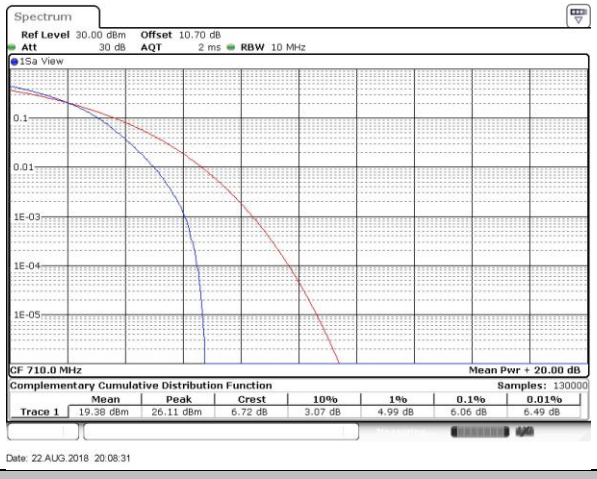
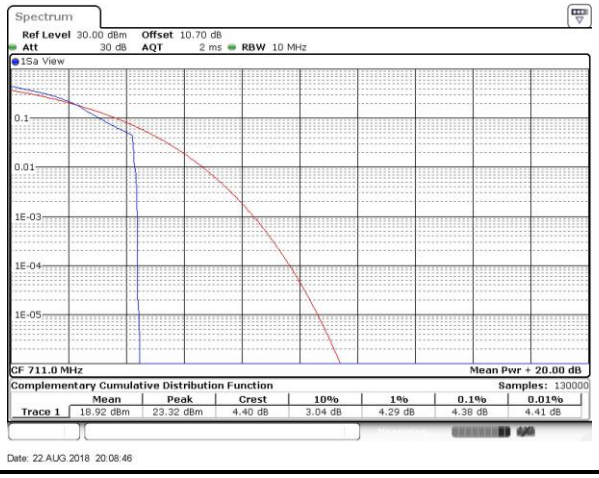
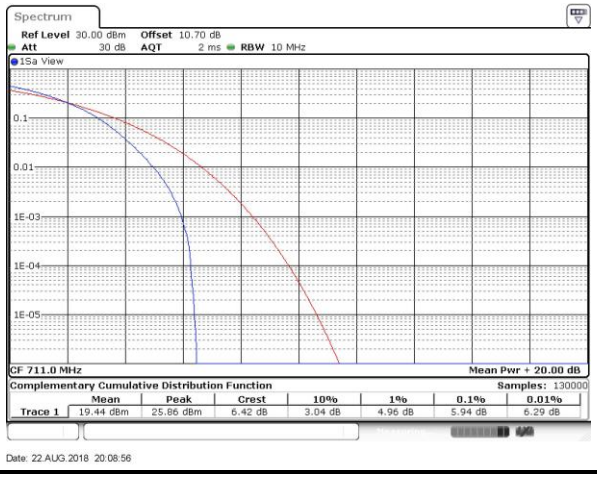
1. Normal Voltage =3.7 V.；Battery End Point (BEP) =3.2 V.；Maximum Voltage =4.35 V.
2. The frequency fundamental emissions stay within the authorized frequency block.

LTE Band 17

Peak-to-Average Ratio

Mode	LTE Band 17 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	3.74	5.13	4.32	6.12	PASS
Middle CH	3.68	4.9	4.72	6.06	
Highest CH	3.57	4.84	4.38	5.94	

LTE Band 17 / 10MHz / QPSK	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	
Highest Channel/ 1RB	**Highest Channel / Full RB**
	

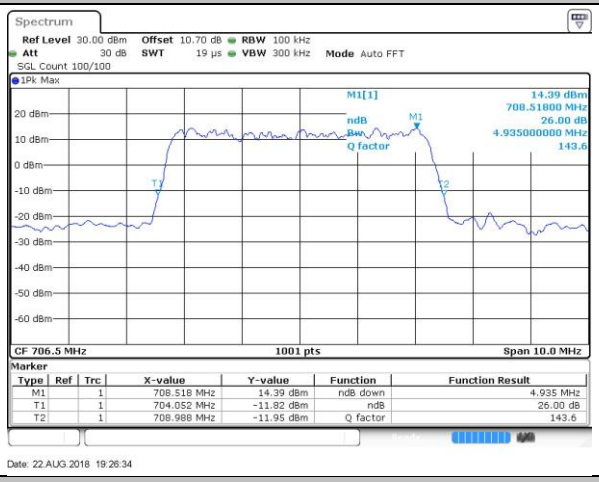
LTE Band 17 / 10MHz / 16QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel/ 1RB	**Middle Channel / Full RB**
	
Highest Channel/ 1RB	**Highest Channel / Full RB**
	

26dB Bandwidth

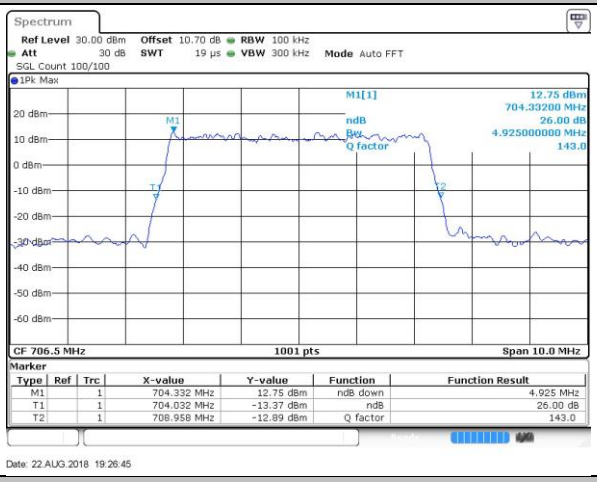
Mode	LTE Band 17 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.94	4.93	9.83	9.83	-	-	-	-
Middle CH	-	-	-	-	4.89	4.88	9.77	9.77	-	-	-	-
Highest CH	-	-	-	-	4.96	4.89	9.63	9.89	-	-	-	-

LTE Band 17

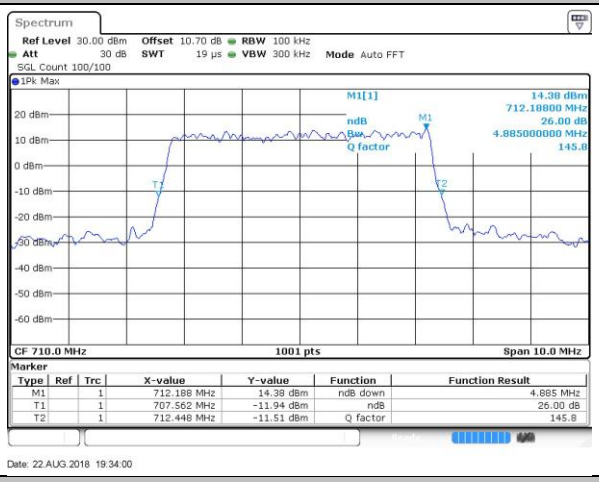
Lowest Channel / 5MHz / QPSK



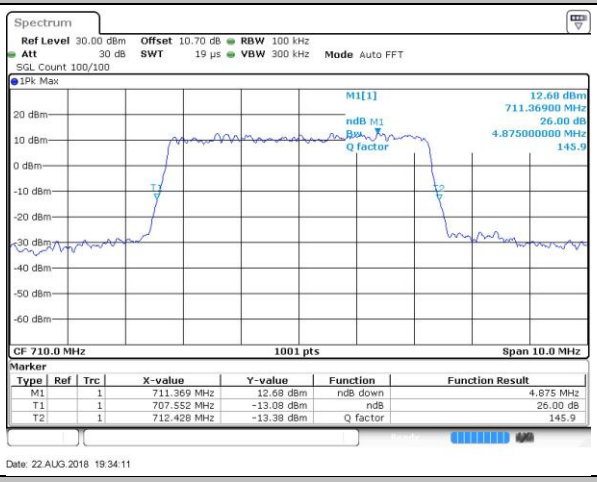
Lowest Channel / 5MHz / 16QAM



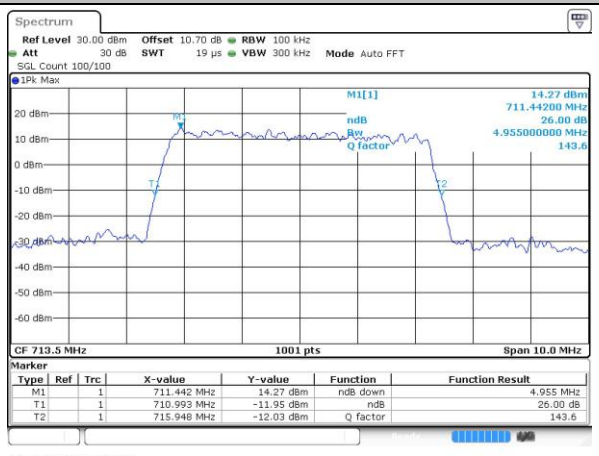
Middle Channel / 5MHz / QPSK



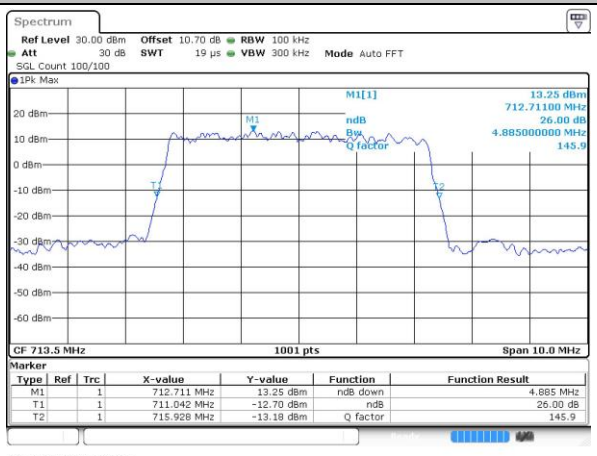
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

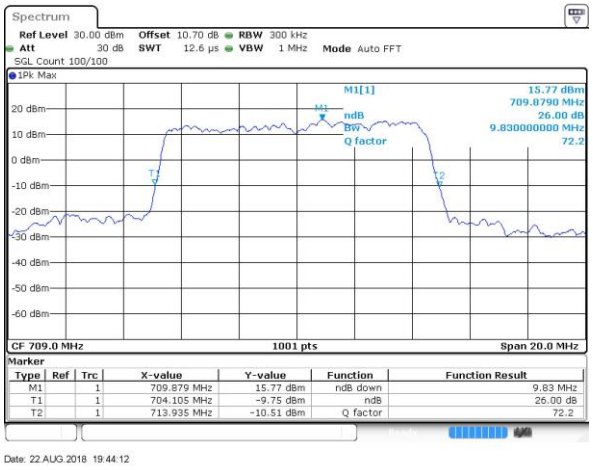


Highest Channel / 5MHz / 16QAM

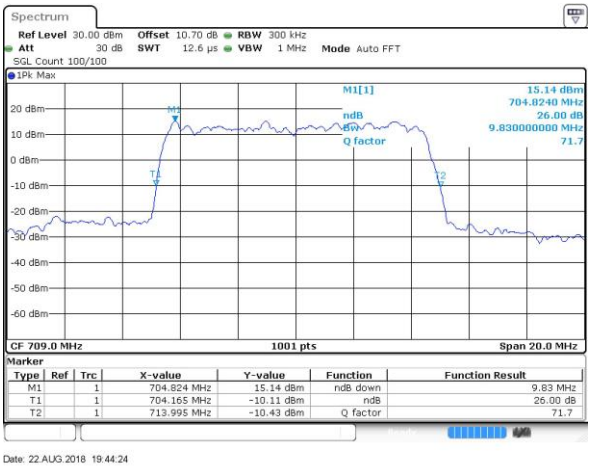


LTE Band 17

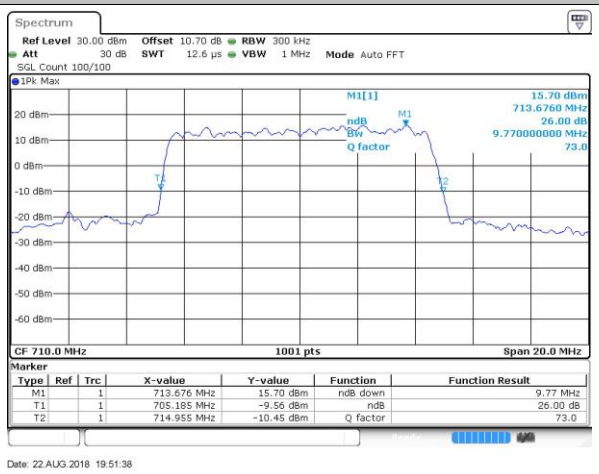
Lowest Channel / 10MHz / QPSK



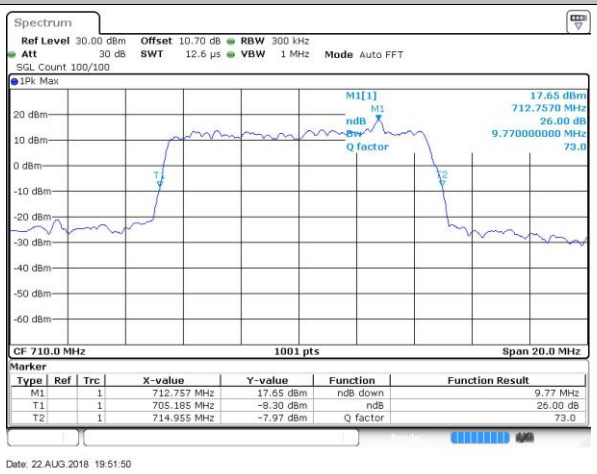
Lowest Channel / 10MHz / 16QAM



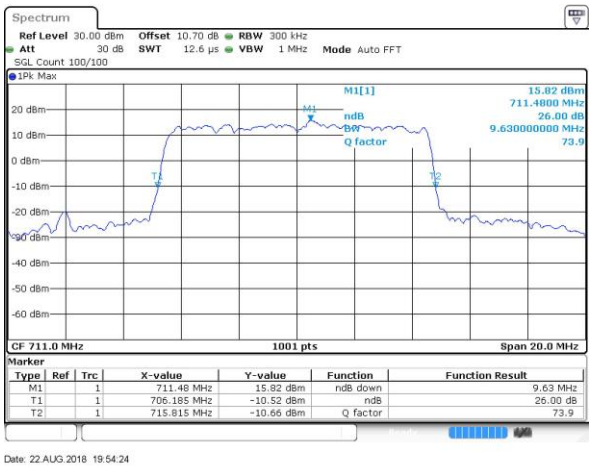
Middle Channel / 10MHz / QPSK



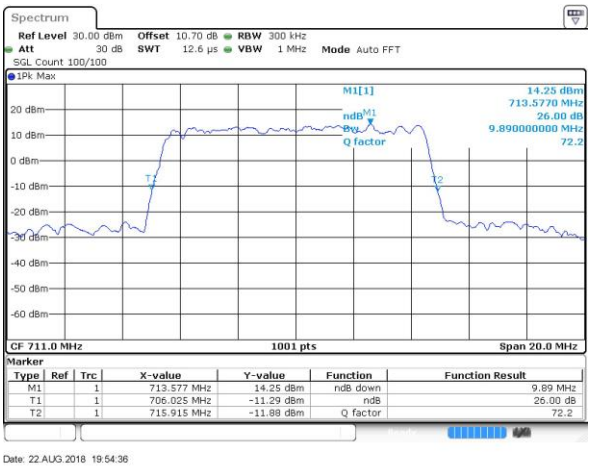
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



Highest Channel / 10MHz / 16QAM

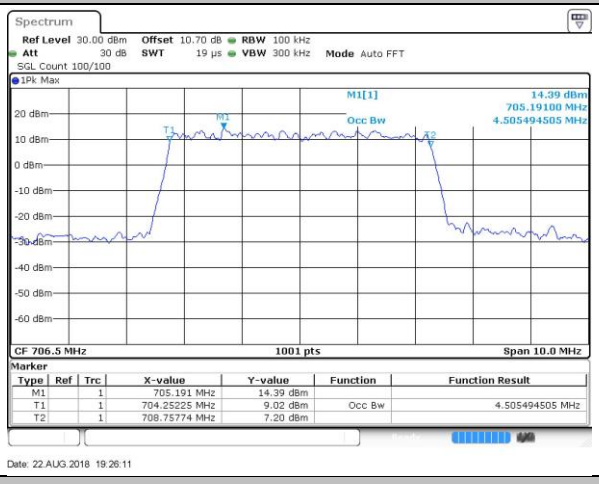


Occupied Bandwidth

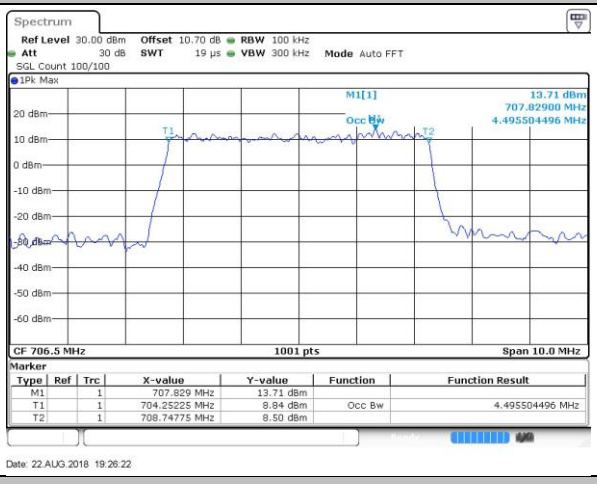
Mode	LTE Band 17 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.51	4.50	9.05	9.03	-	-	-	-
Middle CH	-	-	-	-	4.49	4.50	9.01	8.99	-	-	-	-
Highest CH	-	-	-	-	4.49	4.47	8.97	8.93	-	-	-	-

LTE Band 17

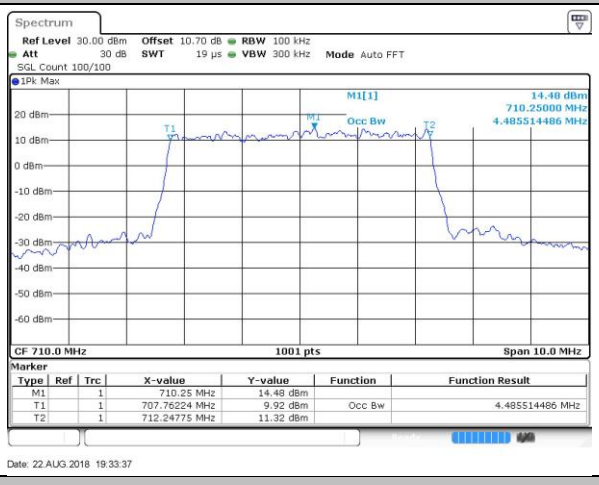
Lowest Channel / 5MHz / QPSK



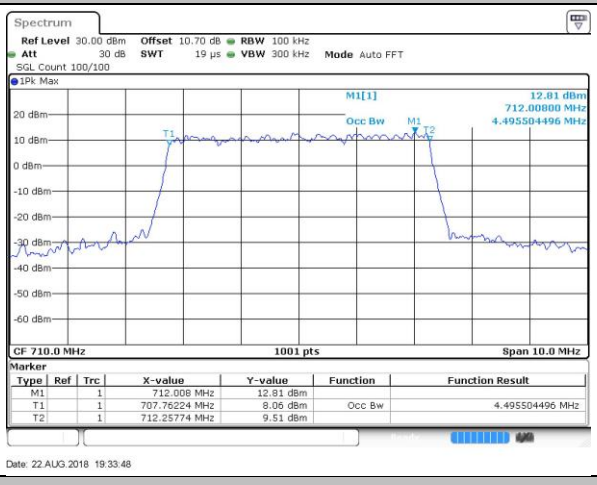
Lowest Channel / 5MHz / 16QAM



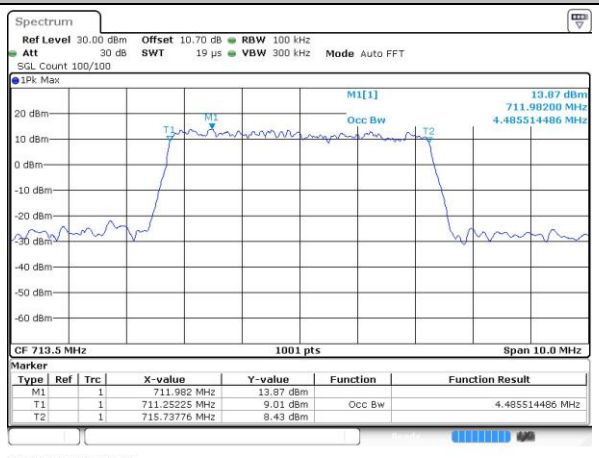
Middle Channel / 5MHz / QPSK



Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



Highest Channel / 5MHz / 16QAM