FCC RADIO TEST REPORT

FCC ID	:	**N7NEM75S**
Equipment	:	**Radio Module**
Brand Name	:	**AirPrime**
Model Name	:	**EM7511**
Applicant	:	**Sierra Wireless Inc.** **13811 Wireless Way Richmond, BC Canada V6V 3A4**
Manufacturer	:	**Sierra Wireless Inc.** **13811 Wireless Way Richmond, BC Canada V6V 3A4**
Standard	:	**47 CFR Part 2, 96**

The product was received on Sep. 14, 2018 and testing was started from Sep. 19, 2018 and completed on Dec. 05, 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 partial 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.)

Table of Contents

History of this test report

Report No.	Version	Description	Issued Date
FG8N1907B	01	Initial issue of report	Nov. 26, 2018
FG8N1907B	02	Add test data of EIRP Power at page 28 ~ 34.	Dec. 06, 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	-
3.3	§96.41	Peak-to-Average Ratio	Pass	
3.4	§96.41	EIRP Power	Pass	-
3.5	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.6	§2.1051 §96.41	Conducted Band Edge Measurement	Pass	-
3.7	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.8	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 0.55 dB at 10655.000 MHz

Declaration of Conformity:
The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.
Comments and Explanations:
None

Reviewed by: Wii Chang

Report Producer: Yimin Ho

1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE

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 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	03CH07-HY

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

1.4 Applied Standards

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

- FCC 47 CFR Part 2, 96
- ANSI / TIA-603-E
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

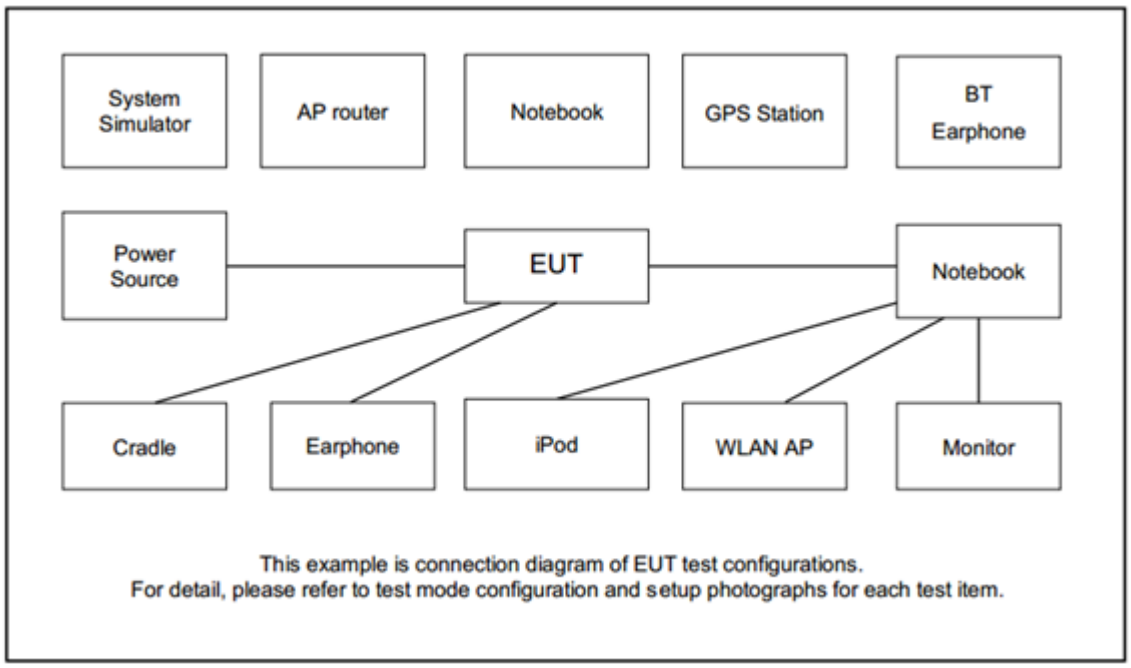
2.1 Test Mode

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 (X plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	48	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
EIRP Pwer	48	-	-	v	v	v	v	v	v	v	v			v	v	v
26dB and 99% Bandwidth	48	-	-	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	48	-	-	v	v	v	v	v	v	v	v		v	v		v
Peak-to-Average Ratio	48	-	-				v	v	v	v	v		v	v	v	v
Conducted Spurious Emission	48	-	-	v	v	v	v	v	v	v	v		v	v	v	v
Frequency Stability	48	-	-		v			v	v	v	v			v	v	v
Radiated Spurious Emission	48	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.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	8821C	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 48 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	55340	55990	56640
	Frequency	3560.0	3625.0	3690.0
15	Channel	55315	55990	56665
	Frequency	3557.5	3625.0	3692.5
10	Channel	55290	55990	56690
	Frequency	3555.0	3625.0	3695.0
5	Channel	55265	55990	56715
	Frequency	3552.5	3625.0	3697.5

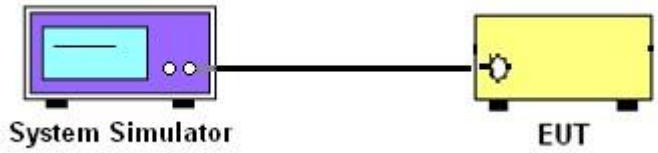
3 Conducted Test Items

3.1 Measuring Instruments

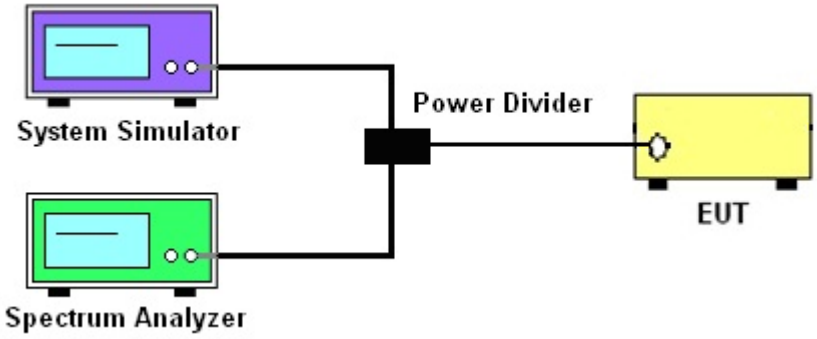
See list of measuring instruments of this test report.

3.1.1 Test Setup

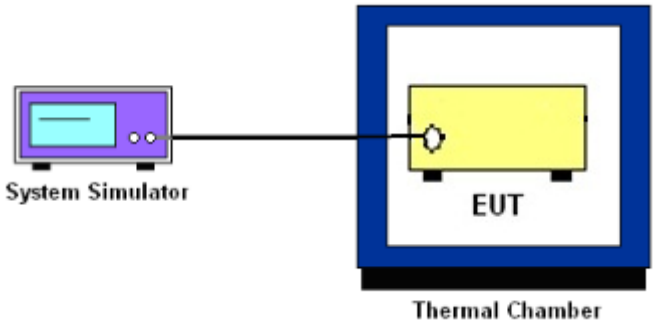
3.1.2 Conducted Output Power



3.1.3 EIRP Power, 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

3.2.1 Description of the Conducted Output Power 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.

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 EIRP Power

3.4.1 Description of the EIRP Power

In any event, the EIRP power shall not exceed 0.2 watt/10 megahertz in any one-megahertz slice of spectrum.

3.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 5.4 and KDB 940660 D01 Part 96 CBRS Eqpt v01 Section 3.2 (b) (2).

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW ≥ 3 × RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep ≥ 2 × span/RBW.
7. Sweep time = auto couple.
8. Employ trace averaging (RMS) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth.
10. Determine the EIRP by adding the effective antenna gain to the adjusted power level.

3.5 Occupied Bandwidth

3.5.1 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.

3.5.2 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.

3.6 Conducted Band Edge Measurement

3.6.1 Description of Conducted Band Edge Measurement

The power of any emission outside outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

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 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. The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed −13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed −25 dBm/MHz

3.7 Conducted Spurious Emission Measurement

3.7.1 Description of Conducted Spurious Emission Measurement

96.41 (e)(2)

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

3.7.2 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 −40dBm/MHz.

3.8 Frequency Stability Measurement

3.8.1 Description of Frequency Stability Measurement

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

3.8.2 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.

3.8.3 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 25±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.

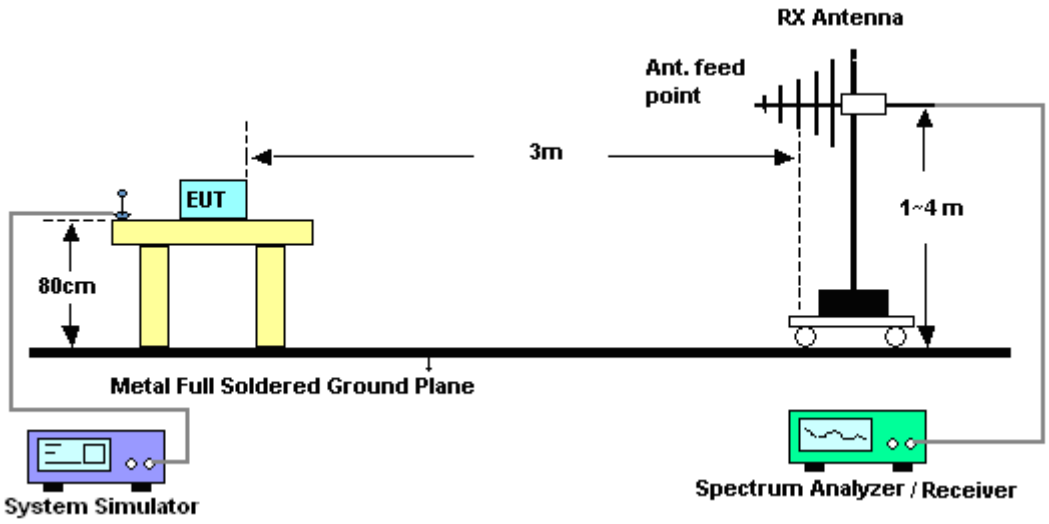
4 Radiated Test Items

4.1 Measuring Instruments

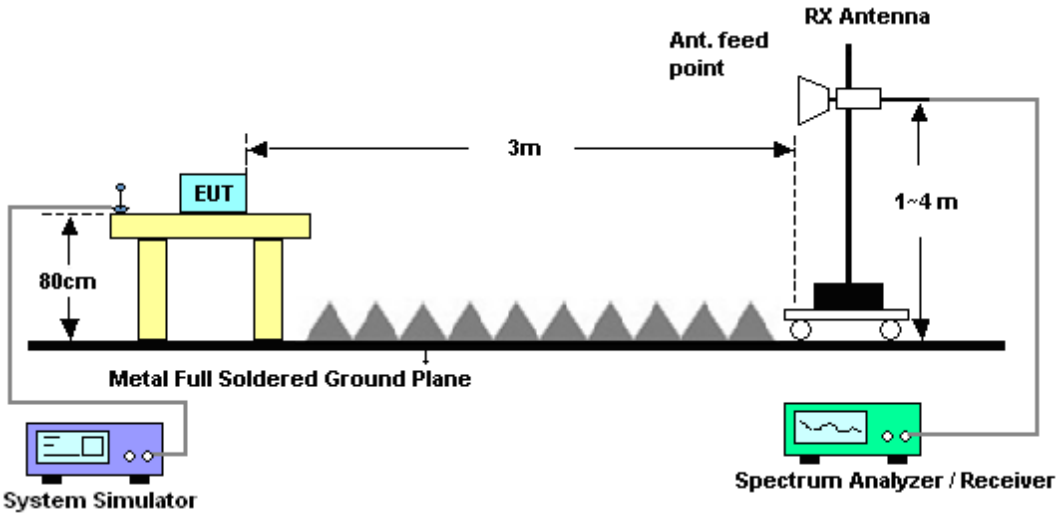
See list of measuring instruments of this test report.

4.2 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission Measurement

4.4.1 Description of Radiated Spurious Emission Measurement

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 -40dBm / MHz.

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

4.4.2 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 height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna 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 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
   Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
   EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
   ERP (dBm) = EIRP - 2.15
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
   The limit line is −40dBm/MHz

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station(Measure)	Anritsu	MT8821C	6201664755	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	Mar. 26, 2018	Sep. 19, 2018 ~ Dec. 05, 2018	Mar. 25, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 07, 2017	Sep. 19, 2018 ~ Sep. 21, 2018	Nov. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 13, 2018	Dec. 05, 2018	Nov. 12, 2019	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Aug. 29, 2018	Sep. 19, 2018 ~ Dec. 05, 2018	Aug. 28, 2019	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~5A	Oct. 06, 2017	Sep. 19, 2018 ~ Sep. 21, 2018	Oct. 05, 2018	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL883644	1V~20V 0.5A~5A	Oct. 16, 2018	Dec. 05, 2018	Oct. 15, 2020	Conducted (TH05-HY)
Coupler	Warison	1-18GHz 20dB 25WSMA Directional Coupler	#B	1G~18GHz	Dec. 04, 2017	Sep. 19, 2018 ~ Sep. 21, 2018	Dec. 03, 2018	Conducted (TH05-HY)
Coupler	Warison	0.5-18G 10dB 30W	DOM5CIW3A1	1G~18GHz	Feb. 21, 2018	Dec. 05, 2018	Feb. 20, 2019	Conducted (TH05-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Sep. 21, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2018	Sep. 21, 2018	Apr. 24, 2019	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	May 21, 2018	Sep. 21, 2018	May 20, 2019	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2018	Sep. 21, 2018	Apr. 16, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4, MY28655/4	9KHz~30MHz	Jan. 02, 2018	Sep. 21, 2018	Jan. 01, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 27, 2018	Sep. 21, 2018	Feb. 26, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 27, 2018	Sep. 21, 2018	Feb. 26, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SF102/2*11SK252	MY4278/2	9kHz~40GHz	May 17, 2018	Sep. 21, 2018	May 16, 2019	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Sep. 21, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Sep. 21, 2018	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 16, 2018	Sep. 21, 2018	Jul. 15, 2019	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Sep. 21, 2018	N/A	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz ~ 40GHz	May 08, 2018	Sep. 21, 2018	May 07, 2019	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00143261	1GHz~18GHz	Dec. 27, 2017	Sep. 21, 2018	Dec. 26, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz- 40GHz	Nov. 10, 2017	Sep. 21, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Jan. 15, 2018	Sep. 21, 2018	Jan. 14, 2019	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00211469	1GHz~18GHz	Aug. 06, 2018	Sep. 21, 2018	Aug. 05, 2019	Radiation (03CH07-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))	**3.05**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.44**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.95**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 48 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.36	22.46	**22.80**
20	1	49		22.17	22.26	22.44
20	1	99		22.24	22.29	22.46
20	50	0		19.39	19.53	19.70
20	50	24		19.33	19.46	19.59
20	50	50		19.33	19.44	19.60
20	100	0		19.37	19.50	19.67
20	1	0	16-QAM	22.50	22.40	22.79
20	1	49		22.38	22.24	22.70
20	1	99		22.32	22.24	22.60
20	50	0		19.33	19.55	19.64
20	50	24		19.23	19.44	19.51
20	50	50		19.23	19.42	19.50
20	100	0		19.18	19.35	19.50
20	1	0	64-QAM	19.38	19.55	19.75
20	1	49		19.25	19.37	19.63
20	1	99		19.28	19.42	19.61
20	50	0		18.30	18.41	18.59
20	50	24		18.36	18.47	18.62
20	50	50		18.36	18.44	18.57
20	100	0		18.49	18.56	18.72
15	1	0	QPSK	22.32	22.42	22.59
15	1	37		22.17	22.26	22.44
15	1	74		22.27	22.32	22.49
15	36	0		19.31	19.45	19.62
15	36	20		19.20	19.33	19.46
15	36	39		19.32	19.43	19.59
15	75	0		19.41	19.54	19.71
15	1	0	16-QAM	22.50	22.40	22.79
15	1	37		22.37	22.23	22.69
15	1	74		22.33	22.25	22.61
15	36	0		19.27	19.49	19.58
15	36	20		19.12	19.33	19.40
15	36	39		19.24	19.43	19.51
15	75	0		19.30	19.47	19.62
15	1	0	64-QAM	19.36	19.53	19.73
15	1	37		19.06	19.18	19.44
15	1	74		19.30	19.44	19.63
15	36	0		18.39	18.50	18.68
15	36	20		18.45	18.56	18.71
15	36	39		18.38	18.46	18.59
15	75	0		18.42	18.49	18.65

LTE Band 48 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.34	22.44	22.61
10	1	25		22.30	22.39	22.57
10	1	49		22.31	22.36	22.53
10	25	0		21.29	21.43	21.60
10	25	12		21.39	21.52	21.65
10	25	25		21.27	21.38	21.54
10	50	0		21.38	21.51	21.68
10	1	0	16-QAM	22.43	22.33	22.72
10	1	25		22.41	22.27	22.73
10	1	49		22.36	22.28	22.64
10	25	0		21.21	21.43	21.52
10	25	12		21.31	21.52	21.59
10	25	25		21.14	21.33	21.41
10	50	0		21.25	21.42	21.57
10	1	0	64-QAM	21.23	21.40	21.60
10	1	25		20.99	21.11	21.37
10	1	49		21.37	21.51	21.70
10	25	0		20.33	20.44	20.62
10	25	12		20.42	20.53	20.68
10	25	25		20.32	20.40	20.53
10	50	0		20.25	20.32	20.48
5	1	0	QPSK	22.33	22.43	22.60
5	1	12		22.23	22.32	22.50
5	1	24		22.32	22.37	22.54
5	12	0		21.23	21.37	21.54
5	12	7		21.25	21.38	21.51
5	12	13		21.22	21.33	21.49
5	25	0		21.24	21.37	21.54
5	1	0	16-QAM	21.50	21.40	21.79
5	1	12		21.45	21.31	21.77
5	1	24		21.45	21.37	21.73
5	12	0		20.28	20.50	20.59
5	12	7		20.30	20.51	20.58
5	12	13		20.29	20.48	20.56
5	25	0		20.25	20.42	20.57
5	1	0	64-QAM	20.20	20.37	20.57
5	1	12		20.18	20.30	20.56
5	1	24		20.21	20.35	20.54
5	12	0		19.37	19.48	19.66
5	12	7		19.38	19.49	19.64
5	12	13		19.40	19.48	19.61
5	25	0		19.39	19.46	19.62

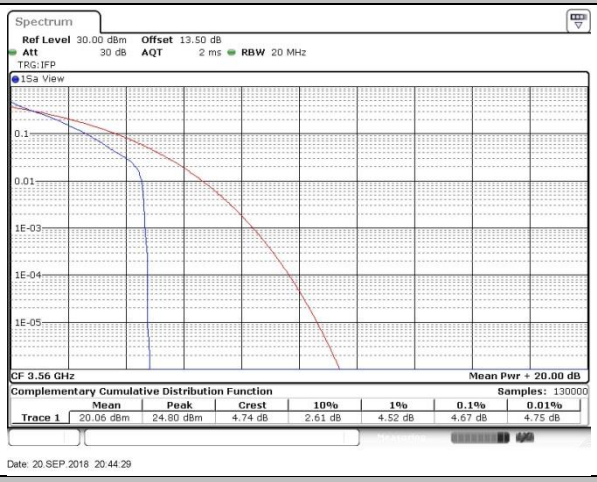
LTE Band 48

Peak-to-Average Ratio

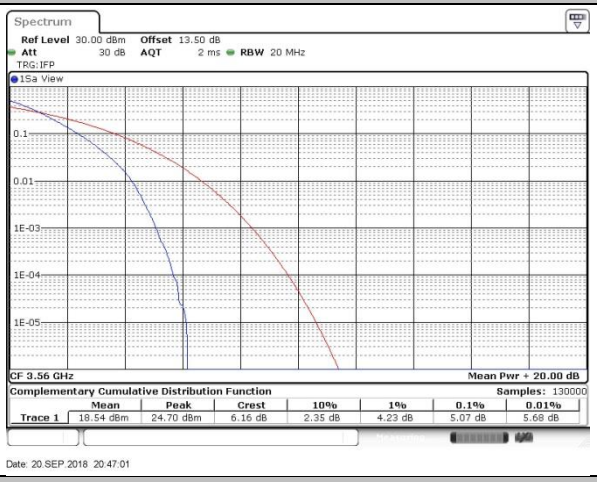
Mode	LTE Band 48 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	4.67	5.07	5.83	5.94	PASS
Middle CH	4.67	5.10	5.57	5.94	
Highest CH	4.7	5.19	6.72	6.06	
Mode	LTE Band 48 / 20MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	6.58	6.32	-	-	PASS
Middle CH	6.32	6.32	-	-	
Highest CH	6.43	6.43	-	-	

LTE Band 48 / 20MHz / QPSK

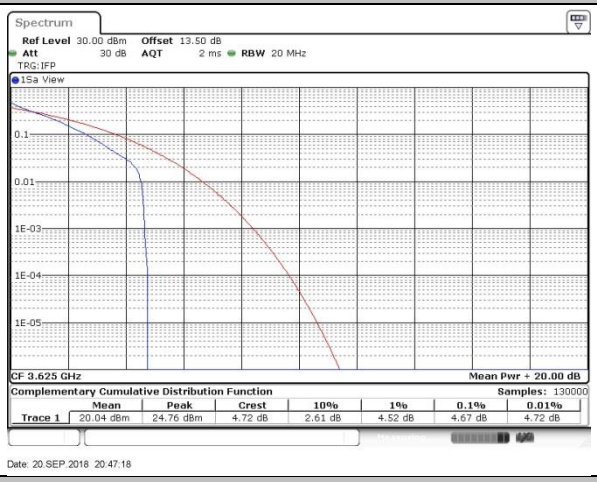
Lowest Channel / 1RB



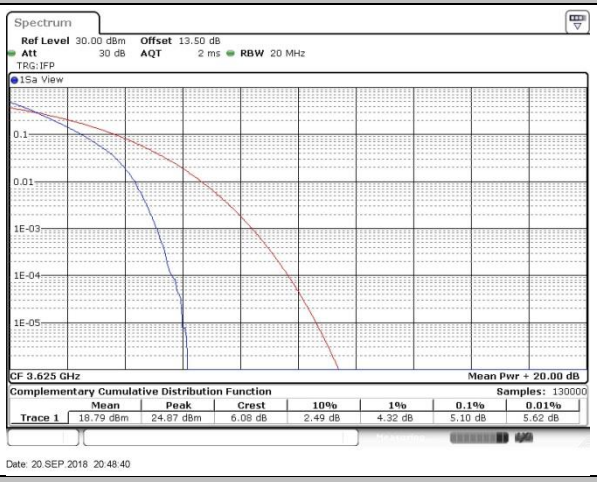
Lowest Channel / Full RB



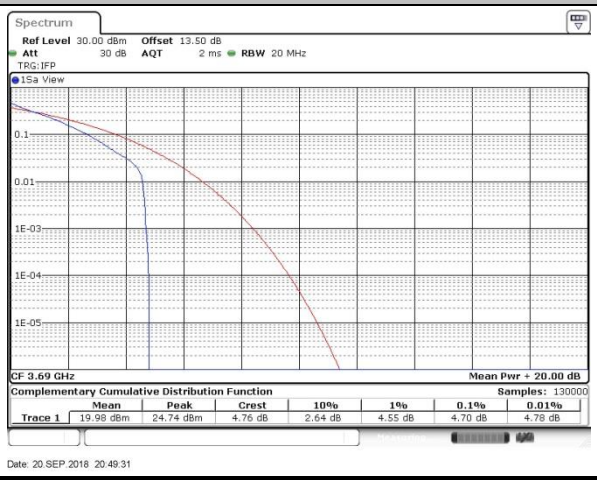
Middle Channel / 1RB



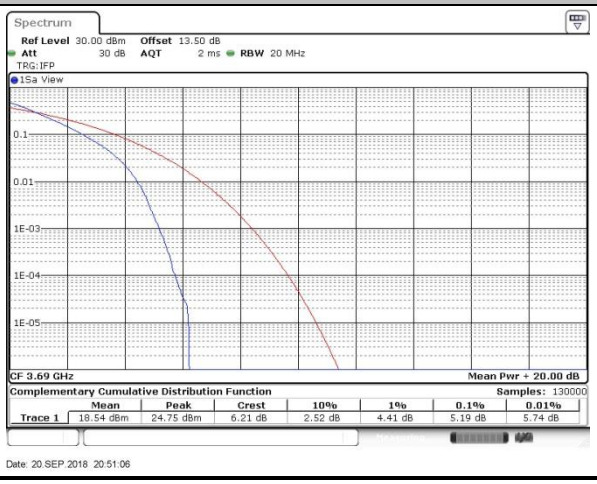
Middle Channel / Full RB

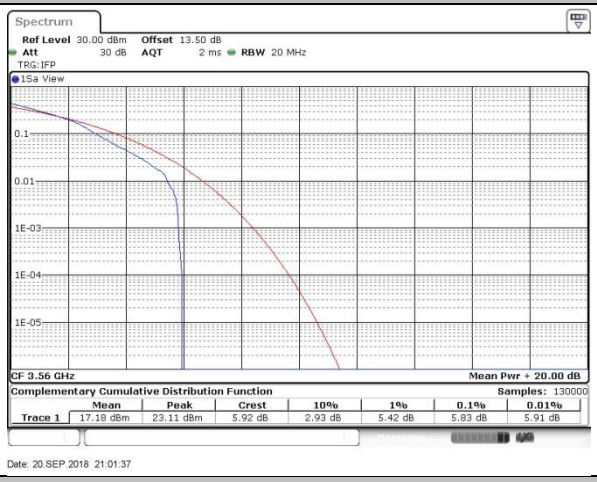
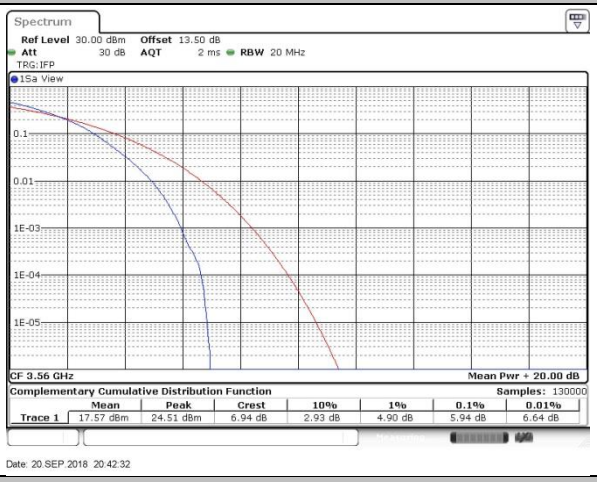
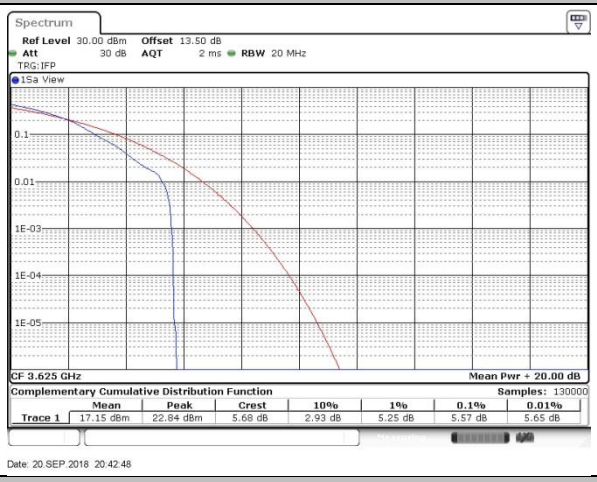
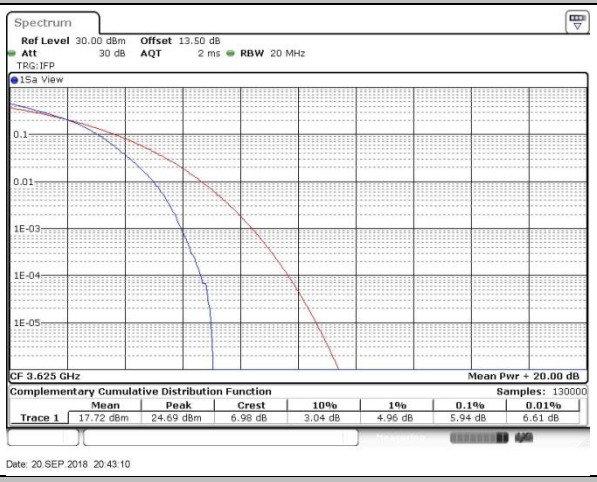
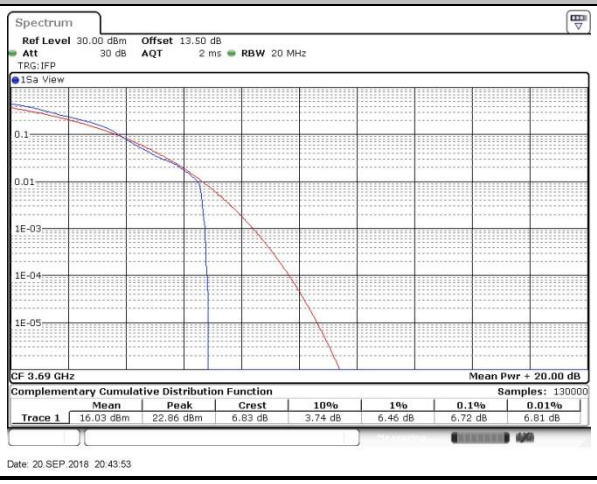
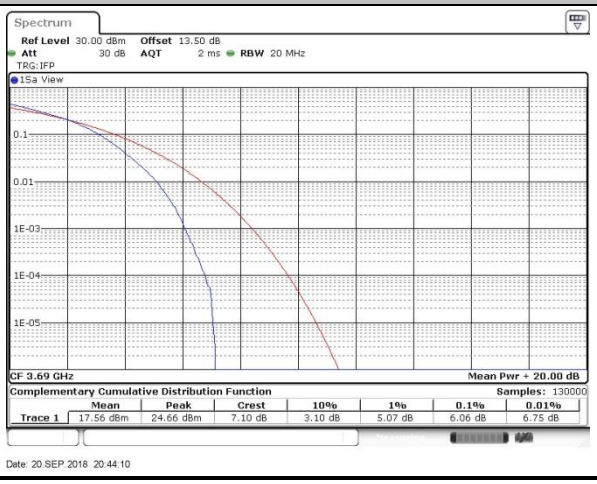


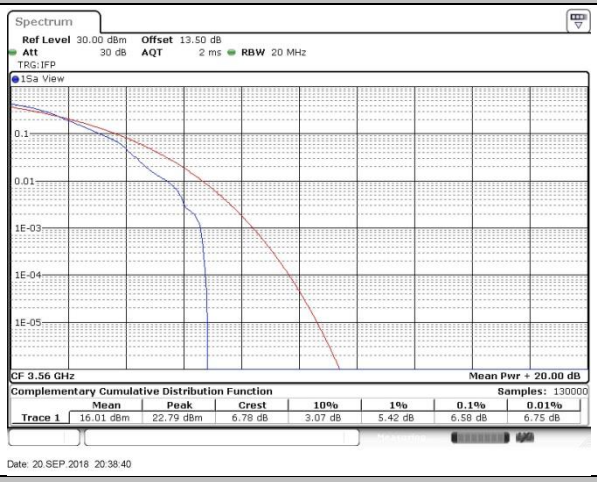
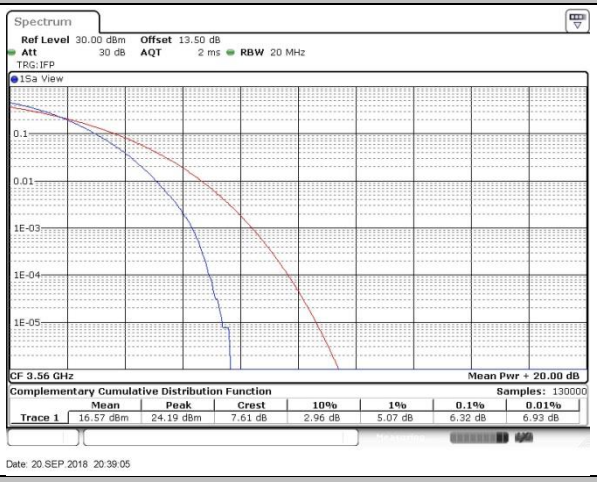
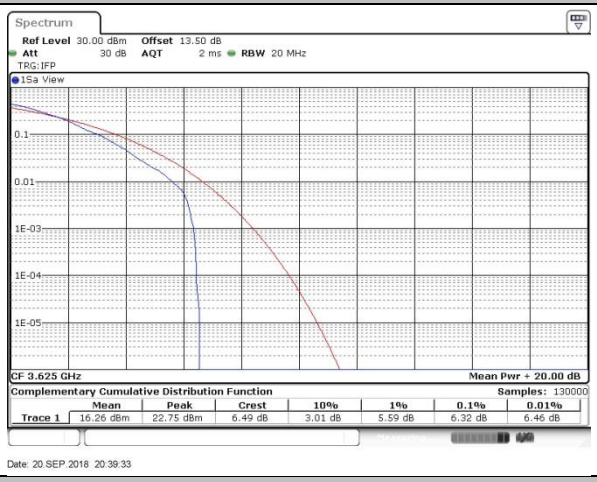
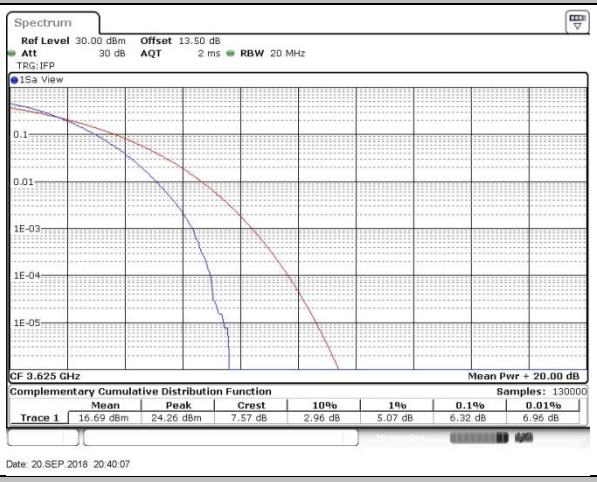
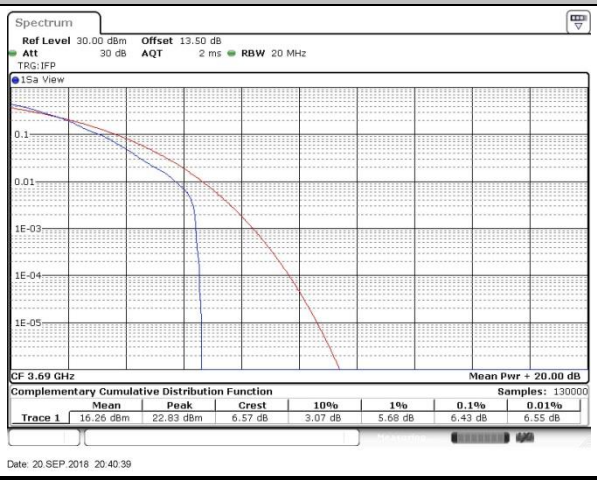
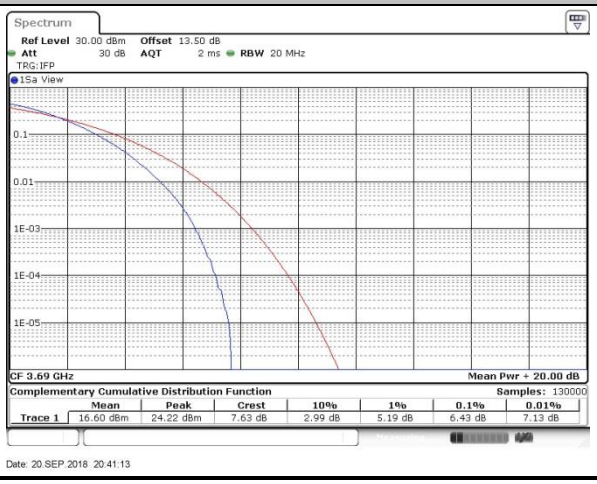
Highest Channel / 1RB



Highest Channel / Full RB



LTE Band 48 / 20MHz / 16QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

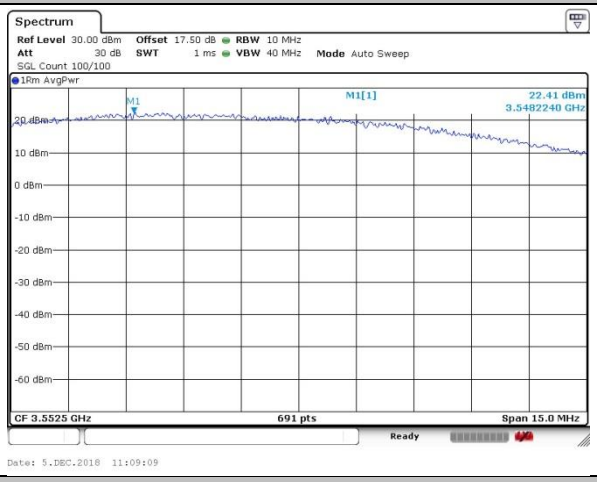
LTE Band 48 / 20MHz / 64QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

EIRP Power

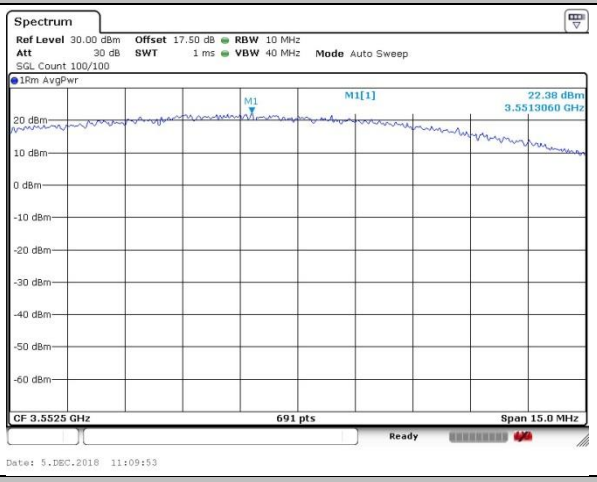
Mode	LTE Band 48 : EIRP Power (dBm/10MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	22.11	22.08	22.66	21.98	22.48	19.74	22.9	20.07
Middle CH	-	-	-	-	22.49	21.27	22.21	21.52	22.65	19.94	22.76	19.45
Highest CH	-	-	-	-	22.92	21.59	22.6	21.92	22.53	19.64	22.67	19.64
Mode	LTE Band 48 : EIRP Power (dBm/10MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	20.57	-	20.83	-	18.68	-	18.44	-
Middle CH	-	-	-	-	20.22	-	20.69	-	18.38	-	18.69	-
Highest CH	-	-	-	-	21.28	-	20.96	-	18.74	-	18.55	-
Antenna Gain	-0.3 dBi											
Limit	23dBm / 10MHz											
Result	Pass											

LTE Band 48 / 5MHz

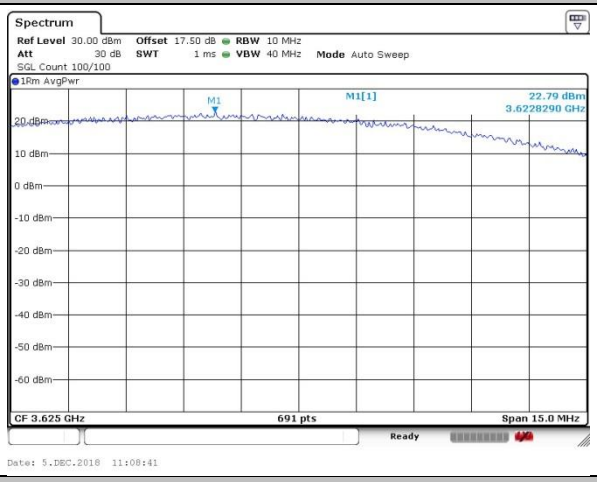
Lowest Channel / 5MHz / 1RB0 / QPSK



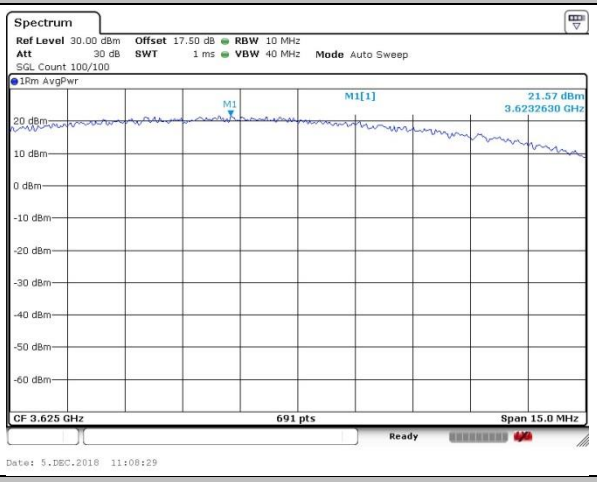
Lowest Channel / 5MHz / 1RB0 / 16QAM



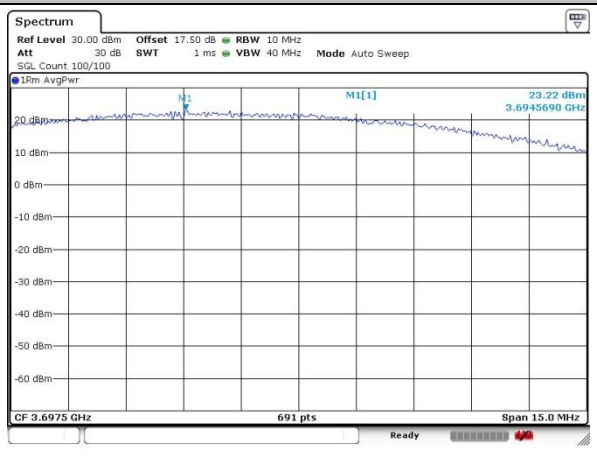
Middle Channel / 5MHz / 1RB0 / QPSK



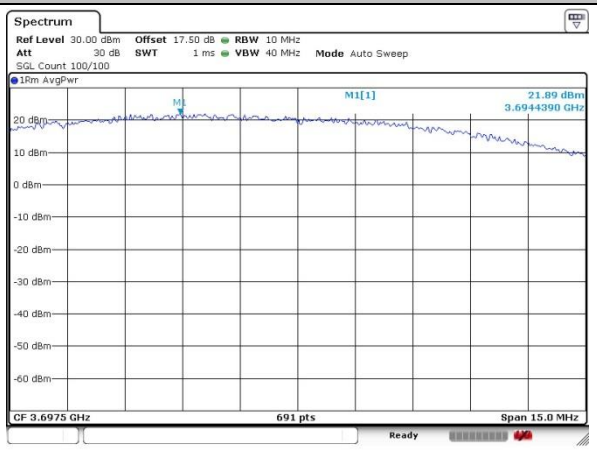
Middle Channel / 5MHz / 1RB0 / 16QAM

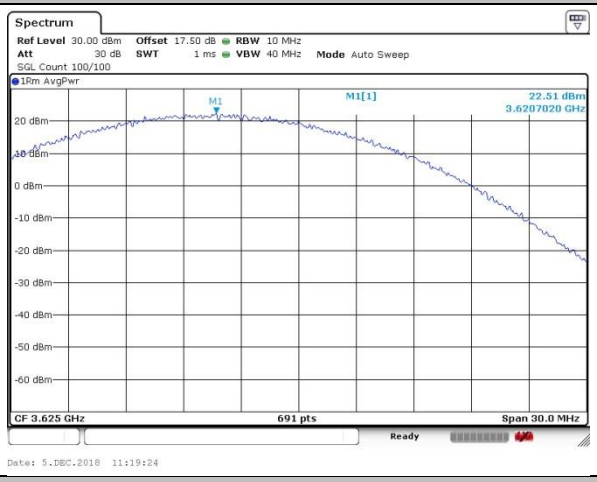
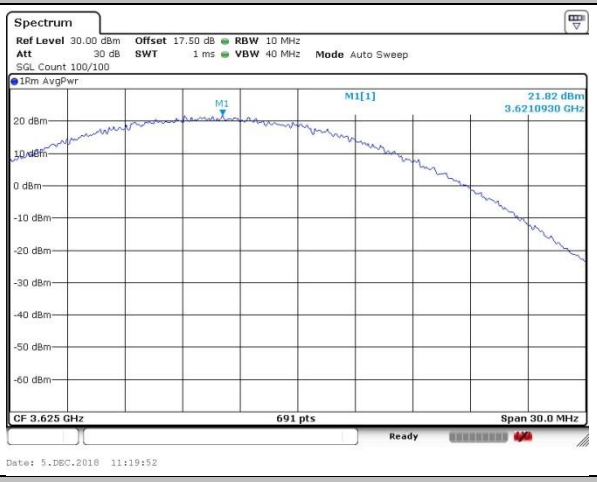
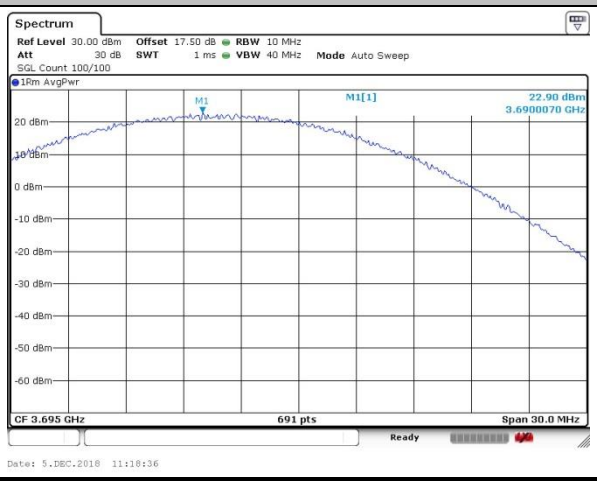
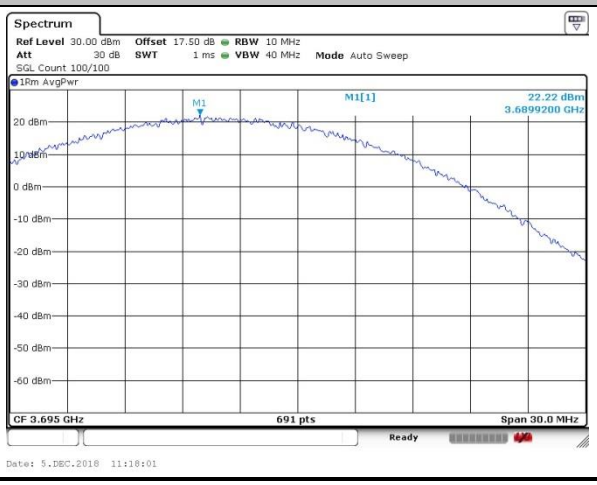


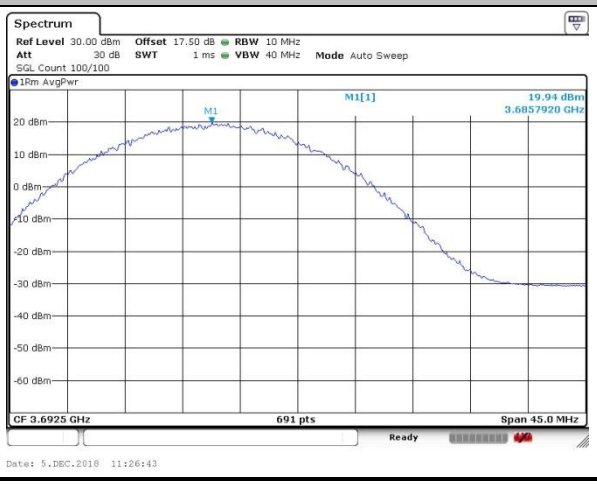
Highest Channel / 5MHz / 1RB0 / QPSK



Highest Channel / 5MHz / 1RB0 / 16QAM



LTE Band 48 / 10MHz	
Lowest Channel / 10MHz / 1RB0 / QPSK	**Lowest Channel / 10MHz / 1RB0 / 16QAM**
	
Middle Channel / 10MHz / 1RB0 / QPSK	**Middle Channel / 10MHz / 1RB0 / 16QAM**
	
Highest Channel / 10MHz / 1RB0 / QPSK	**Highest Channel / 10MHz / 1RB0 / 16QAM**
	

LTE Band 48 / 15MHz	
Lowest Channel / 15MHz / 1RB0 / QPSK	**Lowest Channel / 15MHz / 1RB0 / 16QAM**
	
Middle Channel / 15MHz / 1RB0 / QPSK	**Middle Channel / 15MHz / 1RB0 / 16QAM**
	
Highest Channel / 15MHz / 1RB0 / QPSK	**Highest Channel / 15MHz / 1RB0 / 16QAM**
	

LTE Band 48 / 20MHz

Lowest Channel / 20MHz / 1RB0 / QPSK

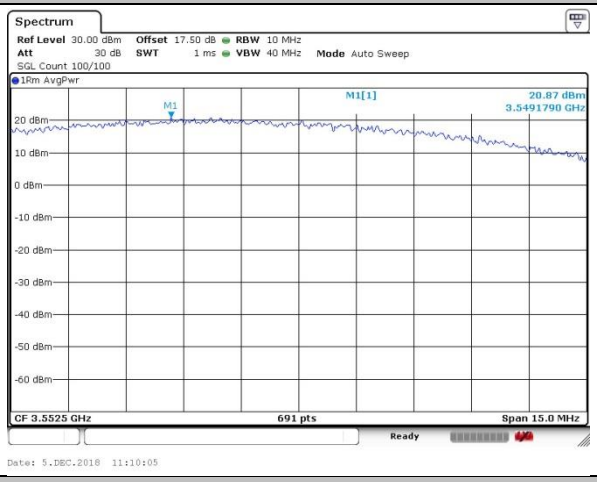
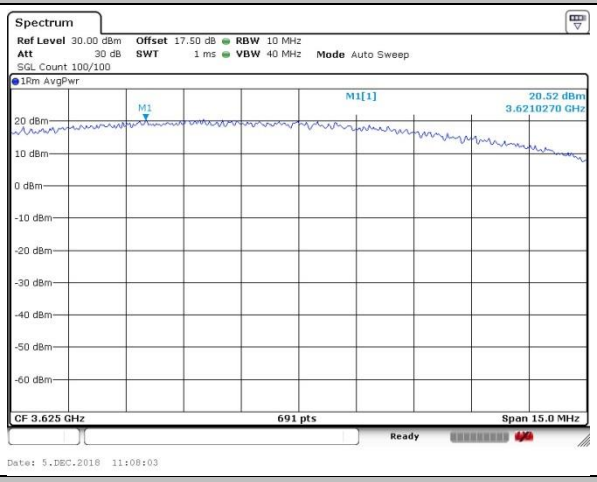
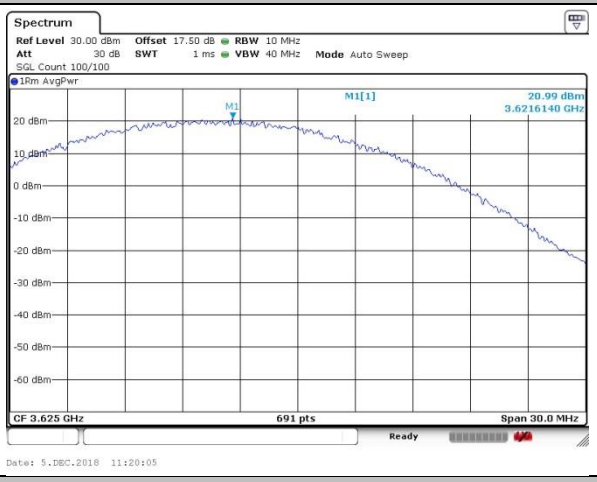
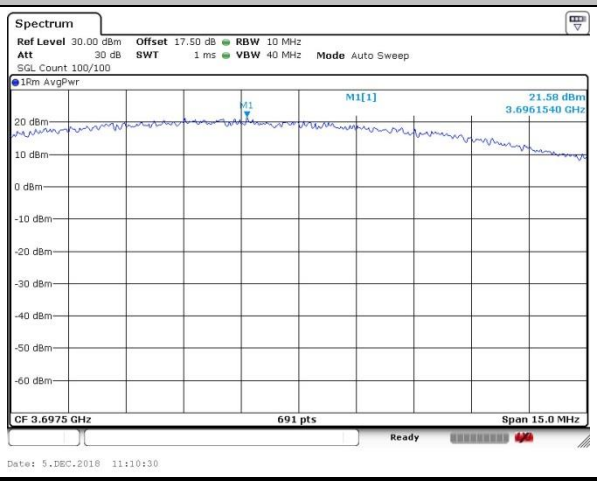
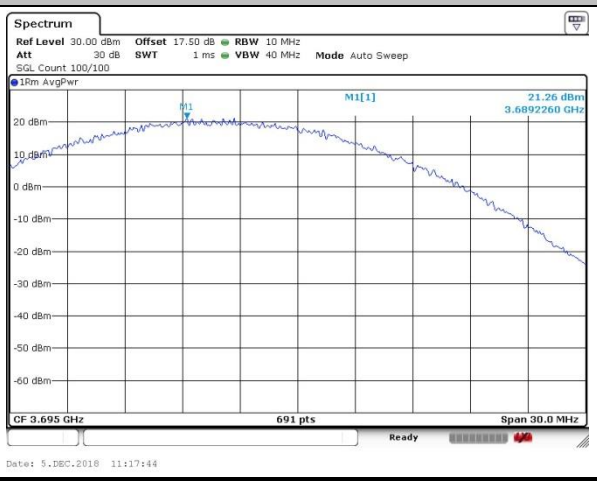
Lowest Channel / 20MHz / 1RB0 / 16QAM

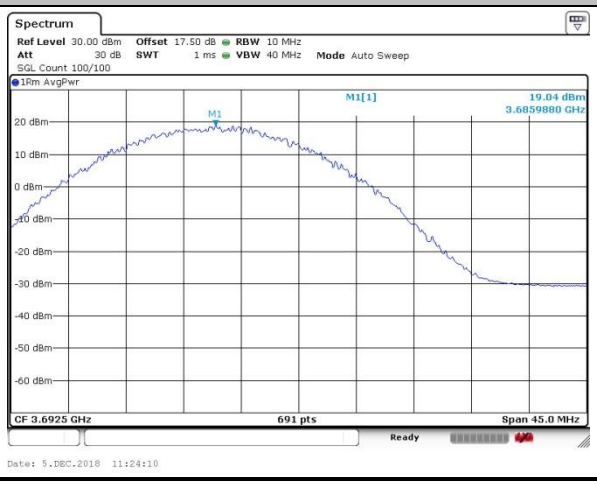
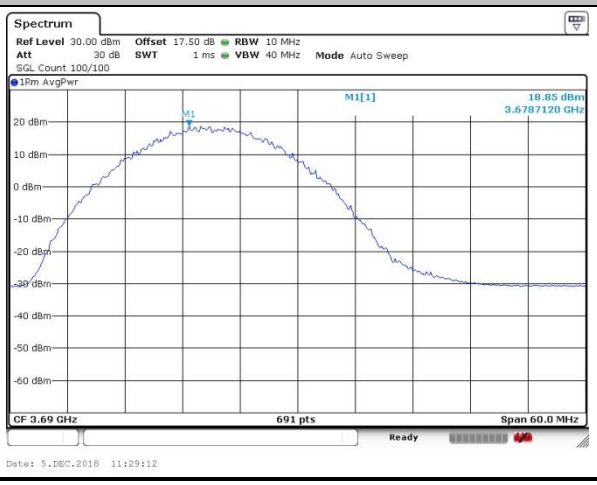
Middle Channel / 20MHz / 1RB0 / QPSK

Middle Channel / 20MHz / 1RB0 / 16QAM

Highest Channel / 20MHz / 1RB0 / QPSK

Highest Channel / 20MHz / 1RB0 /16QAM

LTE Band 48 / 5MHz	LTE Band 48 / 10MHz
Lowest Channel / 5MHz / 1RB0 / 64QAM	**Lowest Channel / 10MHz / 1RB0 / 64QAM**
	
Middle Channel / 5MHz / 1RB0 / 64QAM	**Middle Channel / 10MHz / 1RB0 / 64QAM**
	
Highest Channel / 5MHz / 1RB0 / 64QAM	**Highest Channel / 10MHz / 1RB0 / 64QAM**
	

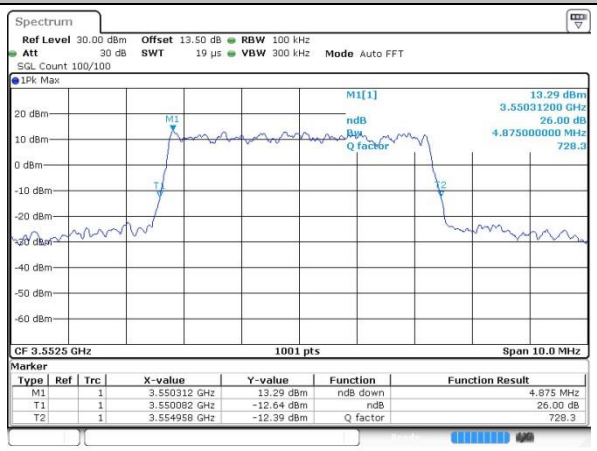
LTE Band 48 / 15MHz	LTE Band 48 / 20MHz
Lowest Channel / 15MHz / 1RB0 / 64QAM	**Lowest Channel / 20MHz / 1RB0 / 64QAM**
	
Middle Channel / 15MHz / 1RB0 / 64QAM	**Middle Channel / 20MHz / 1RB0 / 64QAM**
	
Highest Channel / 15MHz / 1RB0 / 64QAM	**Highest Channel / 20MHz / 1RB0 / 64QAM**
	

26dB Bandwidth

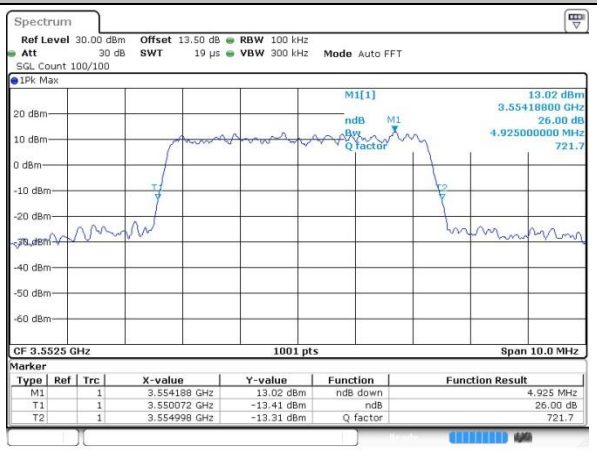
Mode	LTE Band 48 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.88	4.93	9.69	9.63	14.54	14.42	20.14	20.10
Middle CH	-	-	-	-	4.93	4.84	9.77	9.89	14.75	14.21	20.14	20.02
Highest CH	-	-	-	-	4.82	4.73	9.67	9.71	14.18	14.30	20.54	20.14
Mode	LTE Band 48 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.91	-	9.63	-	14.27	-	20.02	-
Middle CH	-	-	-	-	4.95	-	9.71	-	14.54	-	20.14	-
Highest CH	-	-	-	-	4.79	-	9.67	-	14.15	-	20.22	-

LTE Band 48

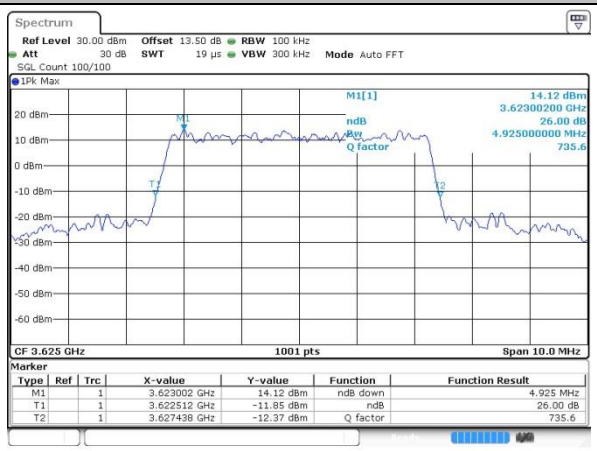
Lowest Channel / 5MHz / QPSK



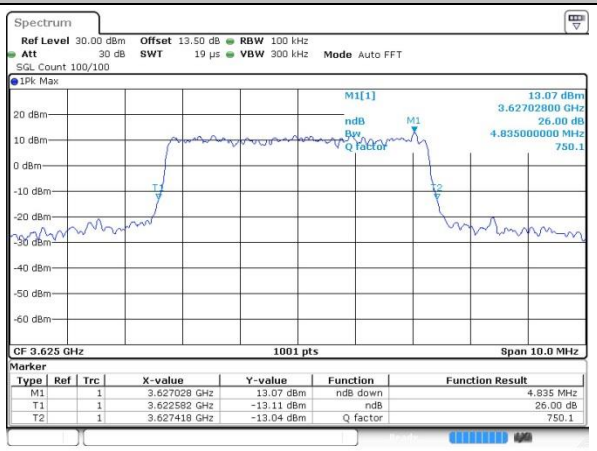
Lowest Channel / 5MHz / 16QAM



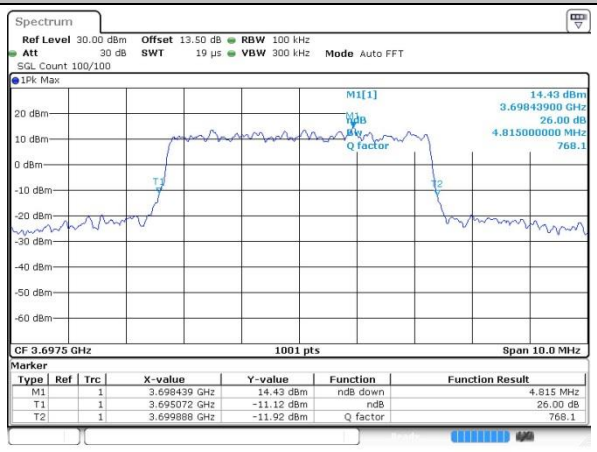
Middle Channel / 5MHz / QPSK



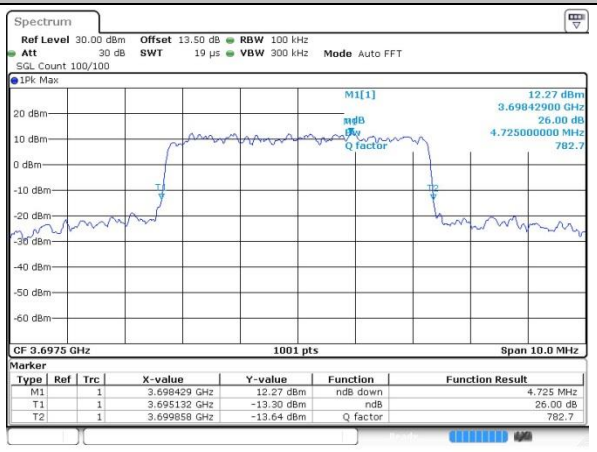
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

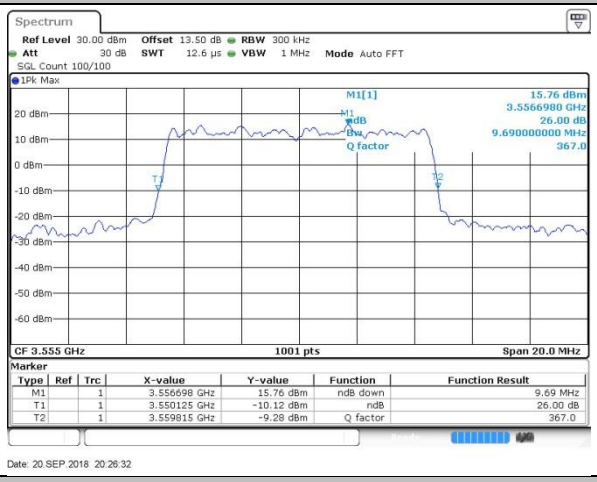


Highest Channel / 5MHz / 16QAM

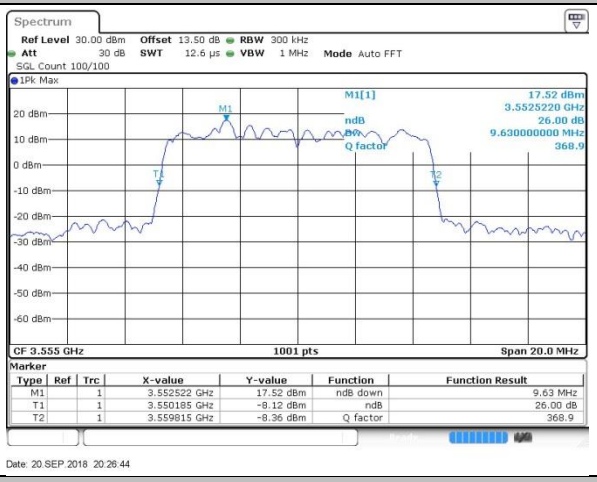


LTE Band 48

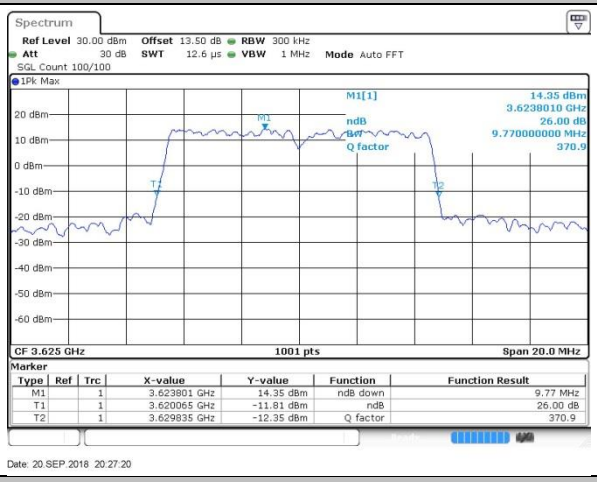
Lowest Channel / 10MHz / QPSK



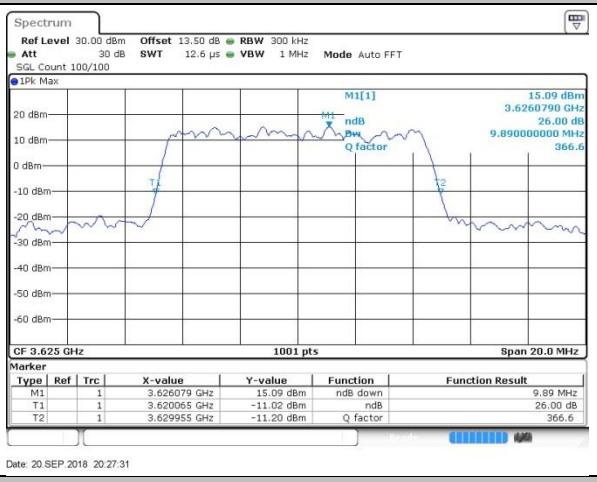
Lowest Channel / 10MHz / 16QAM



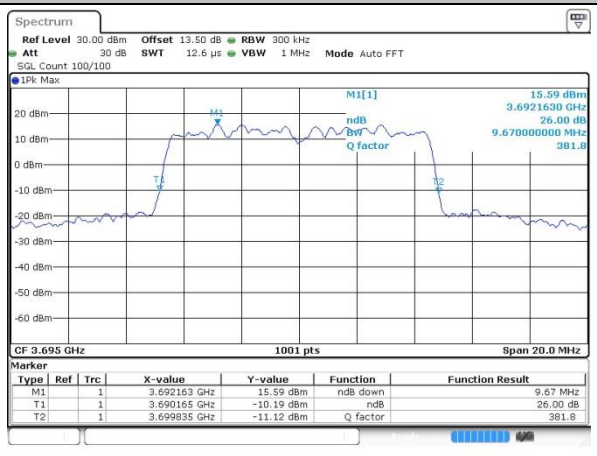
Middle Channel / 10MHz / QPSK



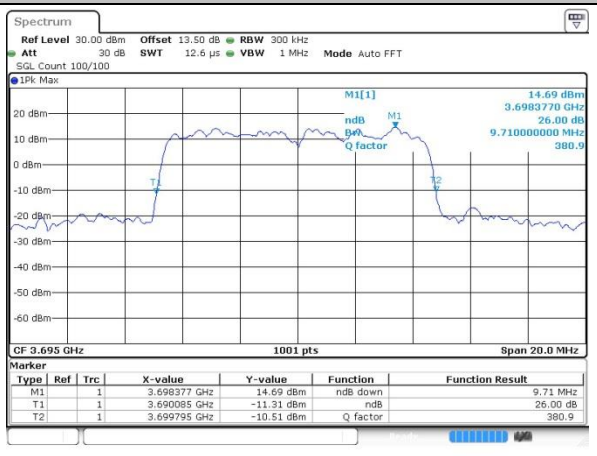
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

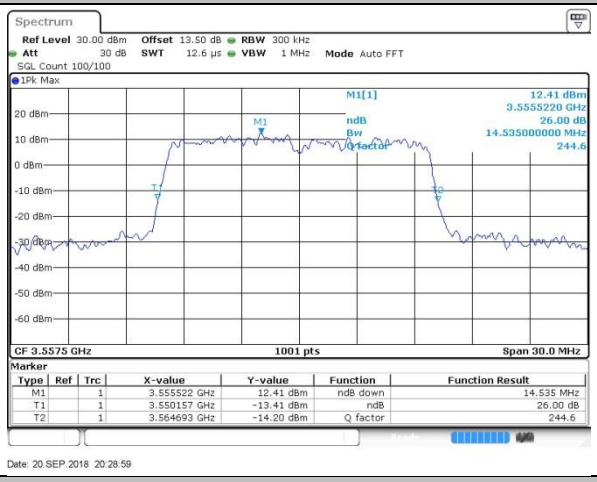


Highest Channel / 10MHz / 16QAM

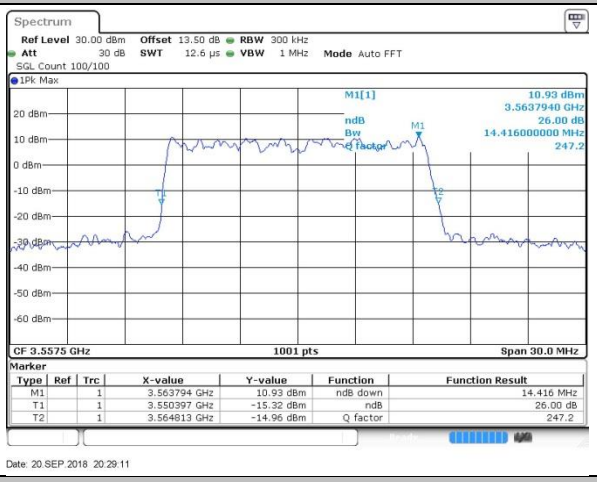


LTE Band 48

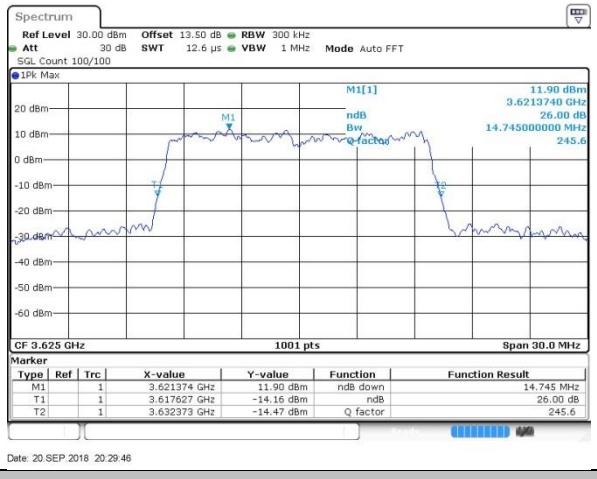
Lowest Channel / 15MHz / QPSK



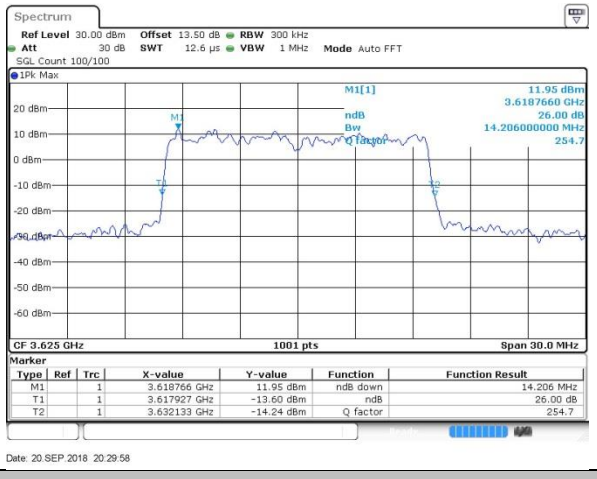
Lowest Channel / 15MHz / 16QAM



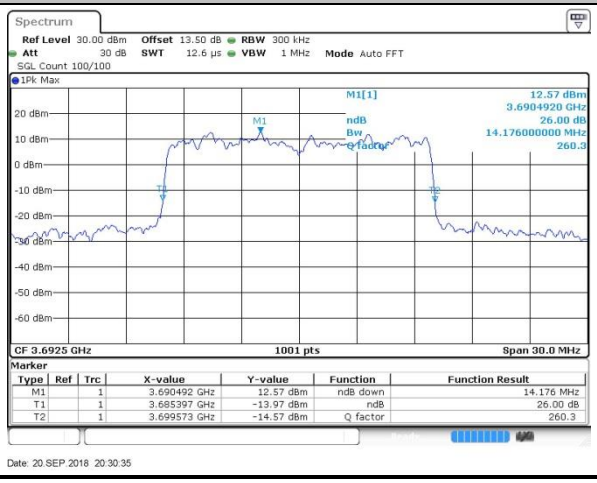
Middle Channel / 15MHz / QPSK



Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK



Highest Channel / 15MHz / 16QAM