FCC/ISED RADIO TEST REPORT

FCC ID	:	**PKRISGM1000**
IC	:	**3229A-M1000**
Equipment	:	**M1000**
Brand Name	:	**inseego**
Model Name	:	**M1000**
Marketing Name	:	**5G MiFi M1000**
HVIN	:	**M1000**
PMN	:	**5G MiFi M1000**
Applicant	:	**Inseego Corp.** **9605 Scranton Road, Suite 300, San Diego, CA 92121**
Manufacturer	:	**Inseego Corp.** **9605 Scranton Road, Suite 300, San Diego, CA 92121**
Standard	:	**47 CFR Part 2, 22(H)** **ISED RSS-132 Issue 3**

The product was received on May 03, 2019 and testing was started from May 09, 2019 and completed on May 10, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, 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.

Jones Tsai

Approved by: Jones Tsai

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
FG950301A	01	Initial issue of report	May 11, 2019

Summary of Test Result

Report Clause	FCC Ref Std. Clause	ISED Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	RSS-Gen 6.12 RSS-132 5.4	Conducted Output Power	Reporting only	-
	§22.913 (a)(2)	RSS-132 5.4 SRSP-503 5.1.3	Effective Radiated Power (Band 5)	Pass	
3.3	-	RSS-132 5.4	Peak-to-Average Ratio	Pass	-
3.4	§2.1049	RSS-Gen 6.7 RSS-132 3.1	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §22.917 (a)	RSS-132.5.5	Conducted Band Edge Measurement (Band 5)	Pass	-
3.6	§2.1051 §22.917 (a)	RSS-132.5.5	Conducted Spurious Emission (Band 5)	Pass	-
3.7	§2.1055 §22.355	RSS-Gen 6.11 RSS-132 5.3	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §22.917 (a)	RSS-132 5.5	Radiated Spurious Emission (Band 5)	Pass	Under limit 42.32 dB at 2504.000 MHz

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Maggie Chiang

1 General Description

1.1 Product Feature of Equipment Under Test

The EUT supports UMTS/LTE/NR/WiFi. The details please find the Operating Description.

1.2 Modification of EUT

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

1.3 Testing Location

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.**		**ISED Registration No.**
	TH05-HY	03CH07-HY	4086B
Test Engineer	Chester Chen	Jesse Wang, Stan Hsieh, and Nick Yu	
Temperature	23~25℃	22~24℃	
Relative Humidity	51~56%	53~55%	

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

FCC Designation No.: TW1190

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)
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ISED RSS-132 Issue 3

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

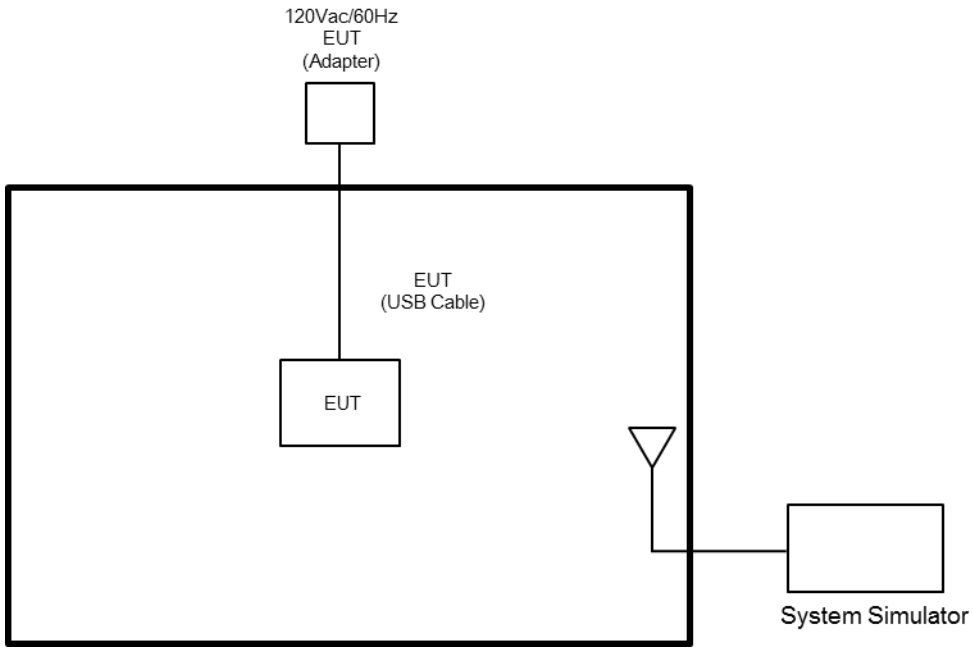
2.1 Test Mode

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		
		3+5	5+3	5+10	10+5	10+10	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	5_CA	v	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	5_CA					v	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	5_CA	v	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	5_CA	v	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	5_CA	v	v	v	v	v	v	v	v	v		v	v	v	v
E.R.P.	5_CA	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	5_CA	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 and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	8821C	N/A	N/A	N/A

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 5 Channel and Frequency List_CA					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
3M + 5M	PCC	Channel	825.6	834.1	842.6
		Frequency	20416	20501	20586
	SCC	Channel	829.5	838	841.5
		Frequency	20455	20540	20575
5M + 3M	PCC	Channel	826.5	835	843.5
		Frequency	20425	20510	20595
	SCC	Channel	830.4	838.9	847.4
		Frequency	20464	20549	20634
5M + 10M	PCC	Channel	826.8	831.8	836.8
		Frequency	20428	20478	20528
	SCC	Channel	834	839	844
		Frequency	20500	20550	20600
10M + 5M	PCC	Channel	829	834	839
		Frequency	20450	20500	20550
	SCC	Channel	836.2	841.2	846.2
		Frequency	20522	20572	20622
10M + 10M	PCC	Channel	829	831.6	834.1
		Frequency	20450	20476	20501
	SCC	Channel	838.9	841.5	844
		Frequency	20549	20575	20600

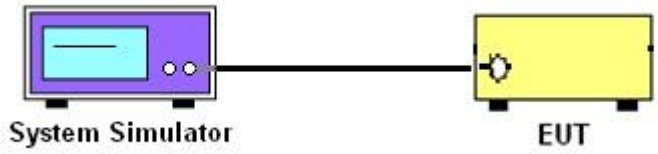
3 Conducted Test Items

3.1 Measuring Instruments

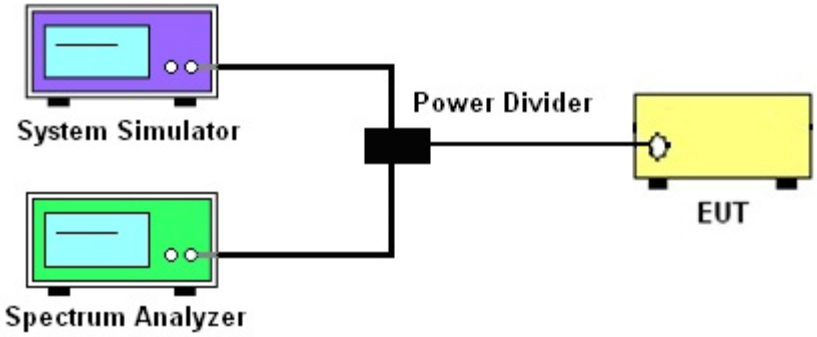
See list of measuring instruments of this test report.

3.1.1 Test Setup

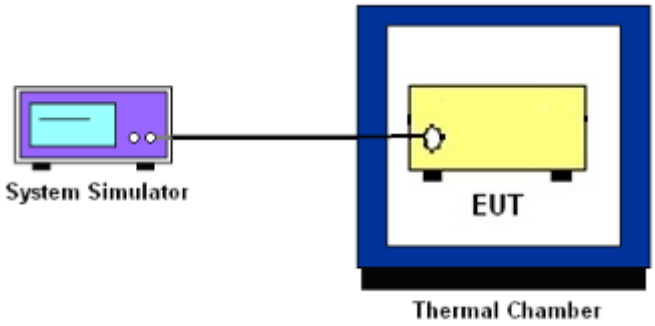
3.1.2 Conducted Output Power



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

3.2.1 Description of the Conducted Output Power Measurement and ERP Measurment

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.

For FCC:

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

For ISED:

The EIRP of mobile transmitters must not exceed 11.5 Watts for LTE Band 5

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 ANSI C63.26-2015 Section 5.2.6

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 ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

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

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.

3.5.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.7.

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)

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.

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 ANSI C63.26-2015 Section 5.7.

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)

3.7 Frequency Stability

3.7.1 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.

3.7.2 Test Procedures for Temperature Variation

For FCC: The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

For IC: The testing follows ANSI C63.6 Setction 5.6

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

For FCC: The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

For IC: The testing follows ANSI C63.6 Setction 5.6

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.

3.7.4 Test Procedures for Frequency Stability

1. The testing follows the Section 6.11 of RSS-GEN.

The EUT was connected to spectrum analyzer and system simulator via a power divider.

The EUT was operated at the lowest and highest channel.

For RSS-132 the frequency range shall be within the frequency range.

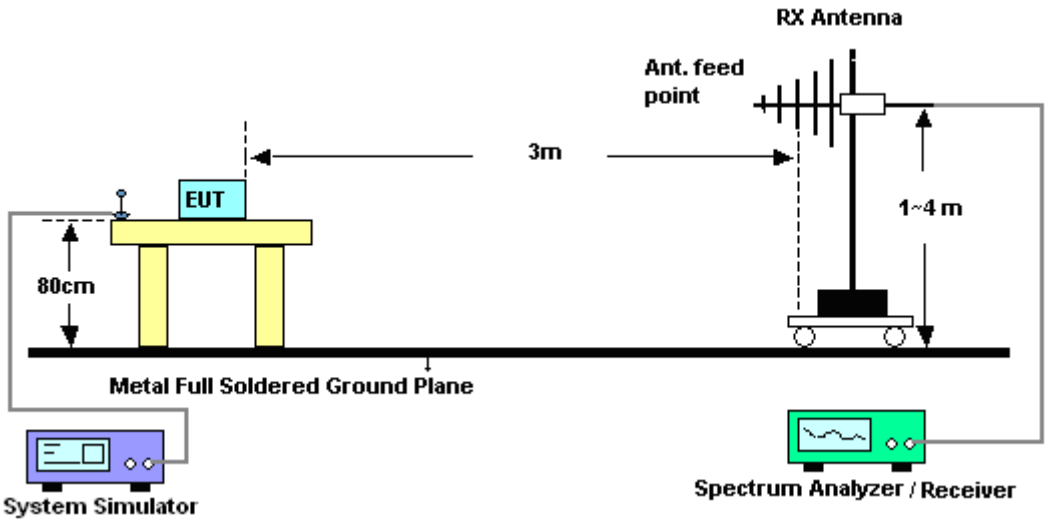
4 Radiated Test Items

4.1 Measuring Instruments

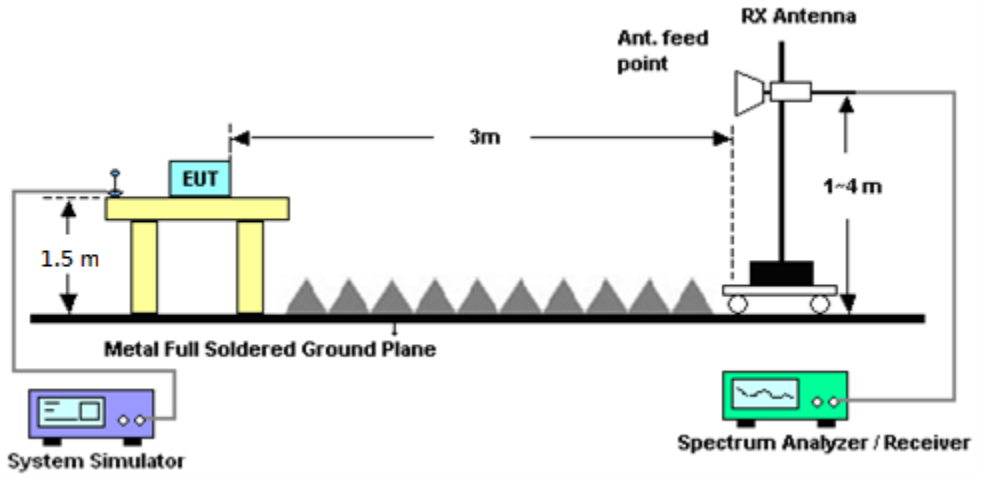
See list of measuring instruments of this test report.

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 Measurement

4.2.1 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 43 + 10 log (P) dB.

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)

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. 03, 2019	May 10, 2019	Mar. 02, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 13, 2018	May 10, 2019	Nov. 12, 2019	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Aug. 29, 2018	May 10, 2019	Aug. 28, 2019	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 02, 2018	May 10, 2019	Oct. 01, 2019	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 14, 2019	May 10, 2019	Jan. 13, 2020	Conducted (TH05-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 02, 2018	May 09, 2019~ May 10, 2019	Dec. 03, 2019	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 23, 2019	May 09, 2019~ May 10, 2019	Jan. 22, 2020	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Nov. 02, 2018	May 09, 2019~ May 10, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
Filter	Microwave	H1G013G1	SN477215	1.0G High Pass	Nov. 02, 2018	May 09, 2019~ May 10, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 26, 2019	May 09, 2019~ May 10, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	May 09, 2019~ May 10, 2019	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	May 09, 2019~ May 10, 2019	N/A	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00143261	1GHz~18GHz	Jan. 07, 2019	May 09, 2019~ May 10, 2019	Jan. 06, 2020	Radiation (03CH07-HY)
Filter	Microwave	H3G018G1	SN477220	3.0G High Pass	Aug. 23, 2018	May 09, 2019~ May 10, 2019	Aug. 22, 2019	Radiation (03CH07-HY)
Software	Audix	E3 6.2009-8-24	80504004656 H	N/A	N/A	May 09, 2019~ May 10, 2019	N/A	Radiation (03CH07-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May 22, 2018	May 09, 2019~ May 10, 2019	May 21, 2019	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	May 10, 2019	Jan. 06, 2020	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 28, 2018	May 10, 2019	Dec. 27, 2019	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&00800N1D01N-06	41912&05	30MHz to 1GHz	Feb. 12, 2019	May 10, 2019	Feb. 11, 2020	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 18, 2019	May 10, 2019	Apr. 17, 2020	Radiation (03CH15-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	May 10, 2019	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	May 10, 2019	N/A	Radiation (03CH15-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	May. 22, 2018	May 10, 2019	May. 21, 2019	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24	RK-000451	N/A	N/A	May 10, 2019	N/A	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	40103&07	30MHz to 1GHz	Apr. 30, 2019	May 10, 2019	Apr. 29, 2020	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-15 30-8000-40SS	SN11	1G Low Pass	Sep. 16, 2018	May 10, 2019	Sep. 15, 2019	Radiation (03CH15-HY)
Notch Filter	Wainwright	WRCG824/849 -40/8SS	SN35	CDMA 850	Nov.07, 2018	May 10, 2019	Nov.06, 2019	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 15, 2019	May 10, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4	30M-18G	Apr. 15, 2019	May 10, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	MTJ	000000-MT18 A-100D3210	30M-18G	Apr. 15, 2019	May 10, 2019	Apr. 14, 2020	Radiation (03CH15-HY)

6 Uncertainty of Evaluation

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)

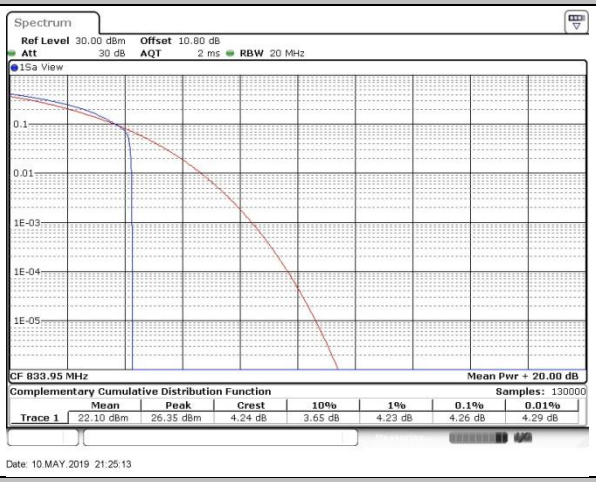
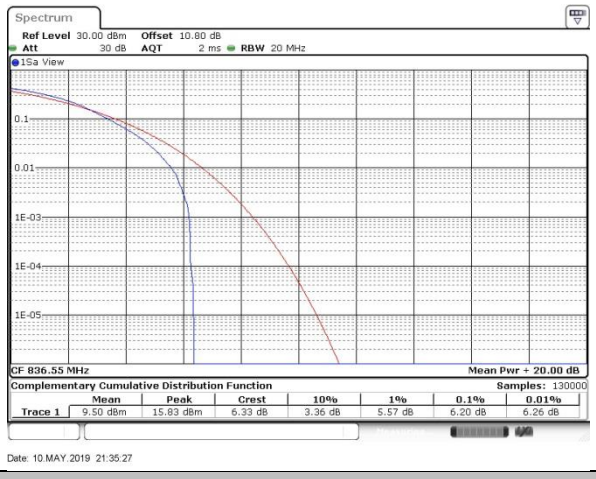
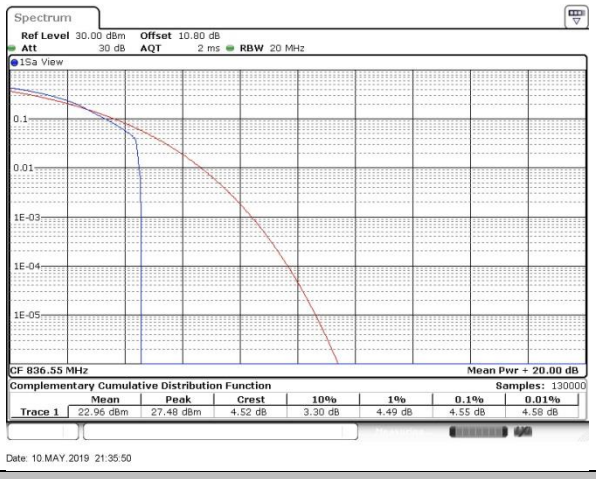
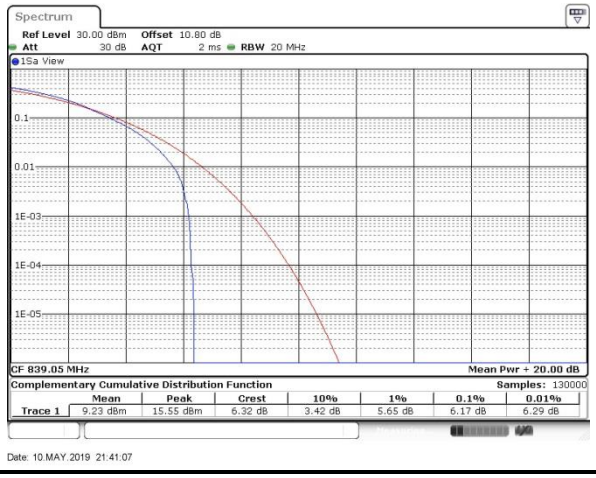
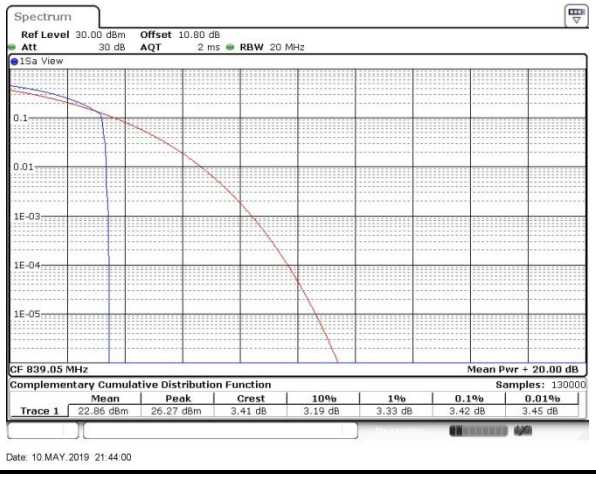
LTE Band 5_CA Maximum Average Power [dBm]								
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest
	RB Size	RB Offset	RB Size	RB Offset				
10+10	0	0	1	49	QPSK	20.62	23.03	21.57
10+10	1	0	0	0		24.05	23.85	23.61
10+10	50	0	0	0		22.58	22.33	22.14
10+10	50	0	50	0		19.54	21.77	20.32
10+10	1	0	1	49		13.45	13.23	13.19
10+10	1	0	1	0		13.73	13.49	13.32
10+10	1	49	1	0		24.02	23.92	23.77
10+10	50	0	1	49		19.11	18.84	18.76
10+10	0	0	1	49	16-QAM	20.11	22.56	21.08
10+10	1	0	0	0		23.61	23.16	23.03
10+10	50	0	0	0		21.60	21.35	21.16
10+10	50	0	50	0		18.88	18.66	19.16
10+10	1	0	1	49		13.85	13.41	13.17
10+10	1	0	1	0		13.96	13.67	13.40
10+10	1	49	1	0		23.47	23.27	23.02
10+10	50	0	1	49		19.21	18.82	18.72
10+10	0	0	1	49	64-QAM	18.95	21.32	19.98
10+10	1	0	0	0		22.35	22.11	21.83
10+10	50	0	0	0		19.94	20.34	20.14
10+10	50	0	50	0		17.58	17.82	18.13
10+10	1	0	1	49		13.64	13.42	13.15
10+10	1	0	1	0		13.89	13.67	13.34
10+10	1	49	1	0		21.42	21.18	20.97
10+10	50	0	1	49		19.11	18.83	18.73
10+5	50	0	25	0	QPSK	22.34	22.02	21.62
10+5	1	0	1	24		14.40	13.97	13.64
10+5	1	49	1	0		**24.13**	23.89	23.27
10+5	50	0	25	0	16-QAM	21.35	21.06	20.67
10+5	1	0	1	24		14.82	14.42	14.09
10+5	1	49	1	0		23.45	23.19	22.66
10+5	50	0	25	0	64-QAM	20.73	21.03	20.64
10+5	1	0	1	24		14.57	14.25	13.89
10+5	1	49	1	0		21.35	21.00	19.68
5+10	25	0	50	0	QPSK	22.20	22.02	21.68
5+10	1	0	1	49		14.38	13.97	13.57
5+10	1	24	1	0		24.09	23.95	23.68
5+10	25	0	50	0	16-QAM	21.26	21.06	20.68
5+10	1	0	1	49		14.71	14.21	13.84
5+10	1	24	1	0		23.19	23.41	22.98
5+10	25	0	50	0	64-QAM	20.31	21.09	20.77
5+10	1	0	1	49		14.44	14.33	13.93
5+10	1	24	1	0		20.52	21.31	20.99

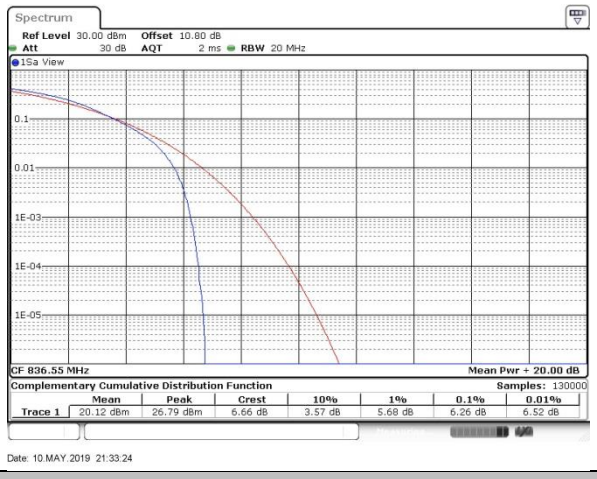
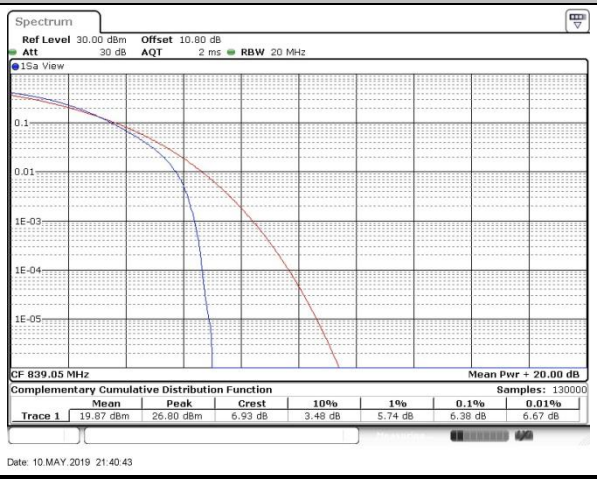
LTE Band 5_CA Maximum Average Power [dBm]								
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest
	RB Size	RB Offset	RB Size	RB Offset				
5+3	25	0	15	0	QPSK	21.92	21.98	21.36
5+3	1	0	1	14		14.55	13.96	13.40
5+3	1	24	1	0		22.05	21.72	21.20
5+3	25	0	15	0	16-QAM	21.05	20.86	20.33
5+3	1	0	1	14		14.89	14.29	13.52
5+3	1	24	1	0		21.56	21.06	20.56
5+3	25	0	15	0	64-QAM	20.09	20.90	20.12
5+3	1	0	1	14		14.82	14.23	13.64
5+3	1	24	1	0		20.41	20.98	20.10
3+5	15	0	25	0	QPSK	21.77	21.94	21.35
3+5	1	0	1	24		14.54	13.95	13.31
3+5	1	14	1	0		21.77	21.83	21.22
3+5	15	0	25	0	16-QAM	21.10	20.94	20.35
3+5	1	0	1	24		15.11	14.34	13.68
3+5	1	14	1	0		21.23	21.14	20.59
3+5	15	0	25	0	64-QAM	20.16	20.92	19.83
3+5	1	0	1	24		14.92	14.15	13.56
3+5	1	14	1	0		20.11	20.85	19.49

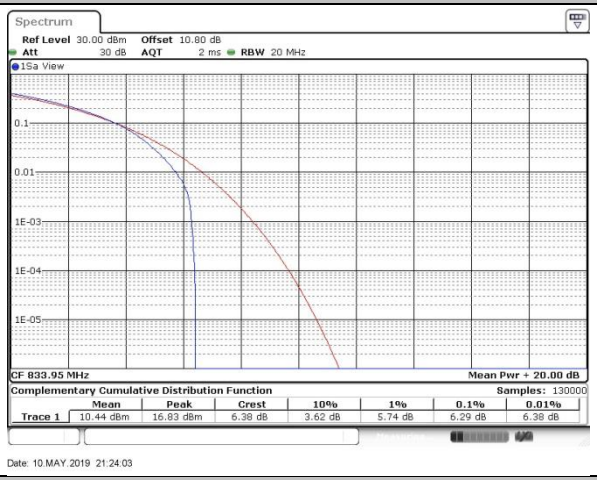
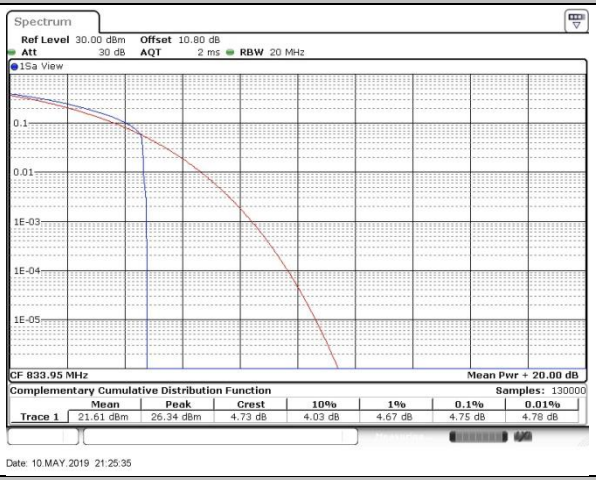
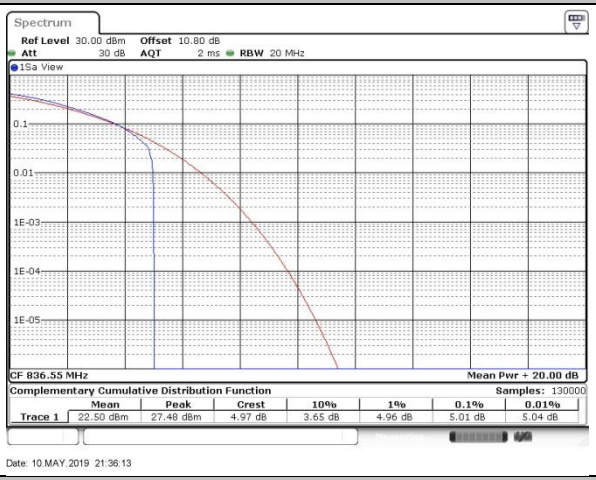
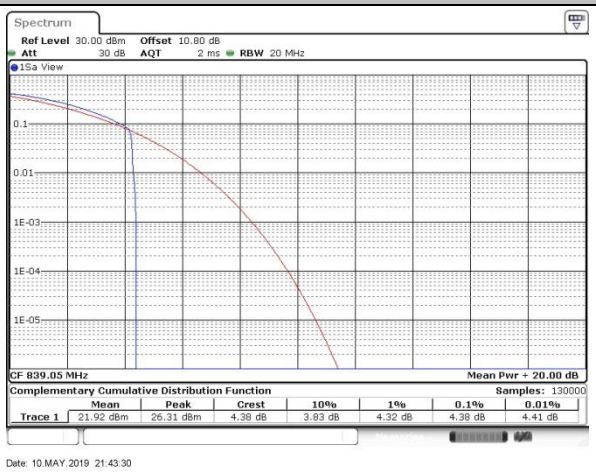
LTE Band 5

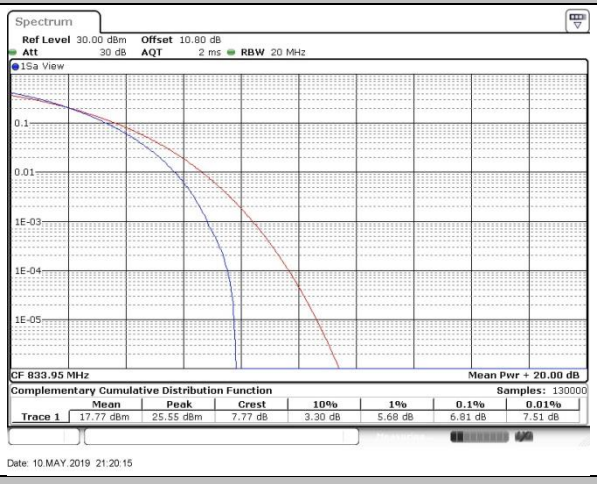
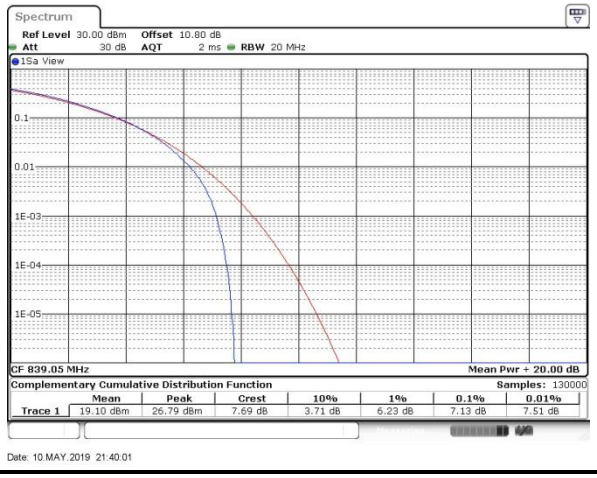
Peak-to-Average Ratio

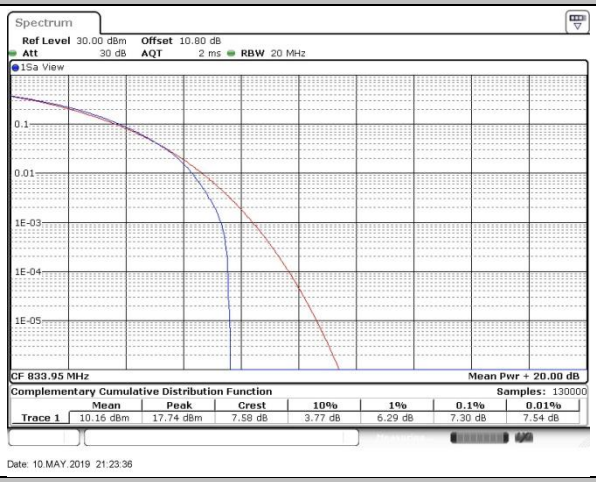
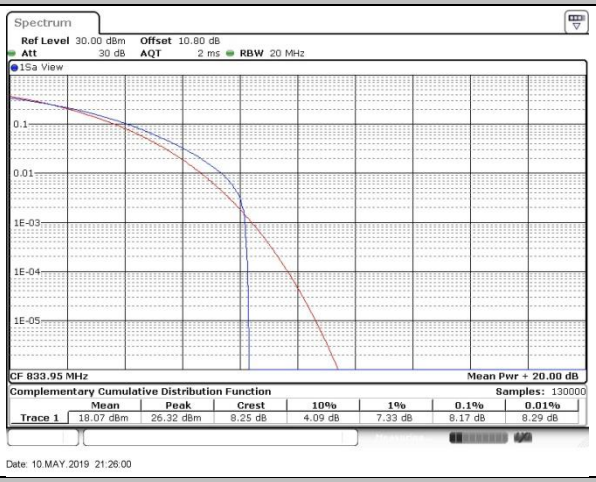
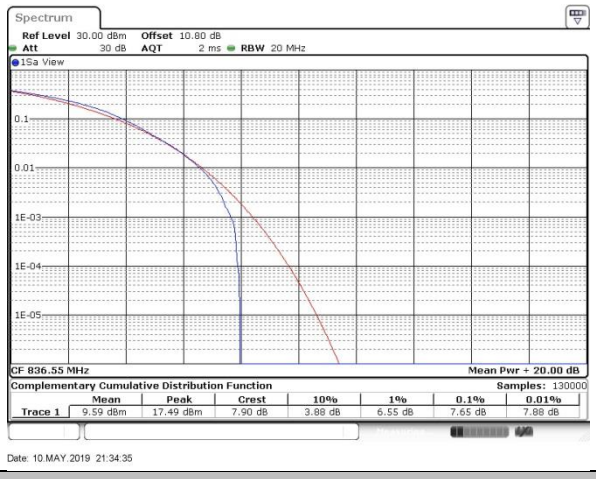
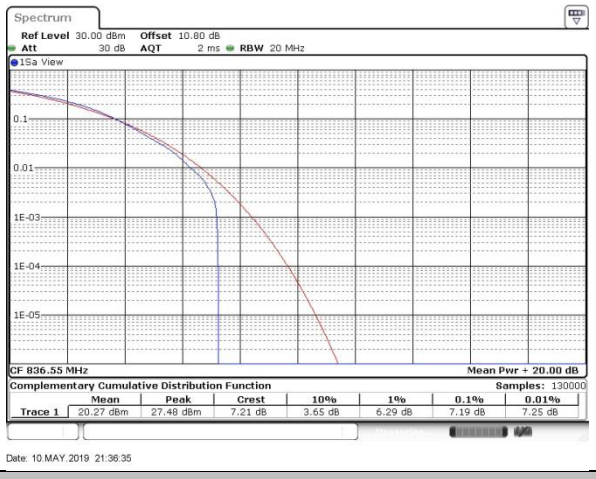
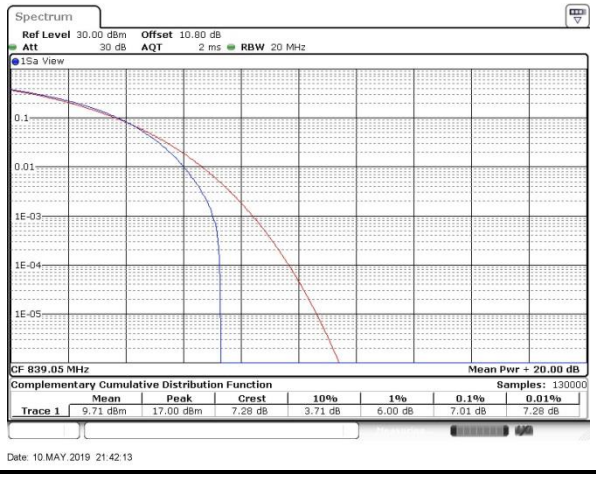
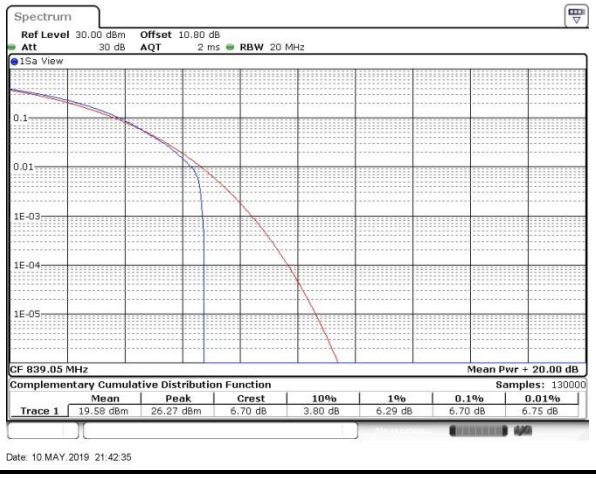
Mode	LTE Band 5 / 10MHz + 10MHz				
Mod.	QPSK				Limit: 13dB
RB Size	1RB0_1RBmax	1RBmax_1RB0	Full RB		Result
Lowest CH	5.83	4.26	6.23		PASS
Middle CH	6.20	4.55	6.26		
Highest CH	6.17	3.42	6.38		
Mode	LTE Band 5 / 10MHz + 10MHz				
Mod.	16QAM				Limit: 13dB
RB Size	1RB0_1RBmax	1RBmax_1RB0	Full RB		Result
Lowest CH	6.29	4.75	6.81	-	PASS
Middle CH	6.14	5.01	7.19	-	
Highest CH	6.09	4.38	7.13	-	
Mode	LTE Band 5 / 10MHz + 10MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB0_1RBmax	1RBmax_1RB0	Full RB		Result
Lowest CH	7.30	8.17	7.33	-	PASS
Middle CH	7.65	7.19	7.42	-	
Highest CH	7.01	6.70	7.51	-	

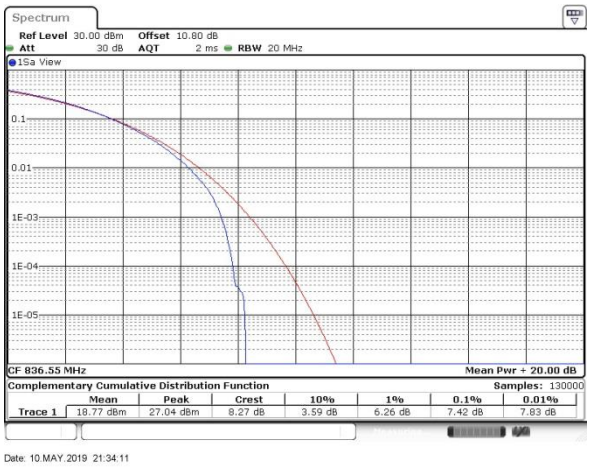
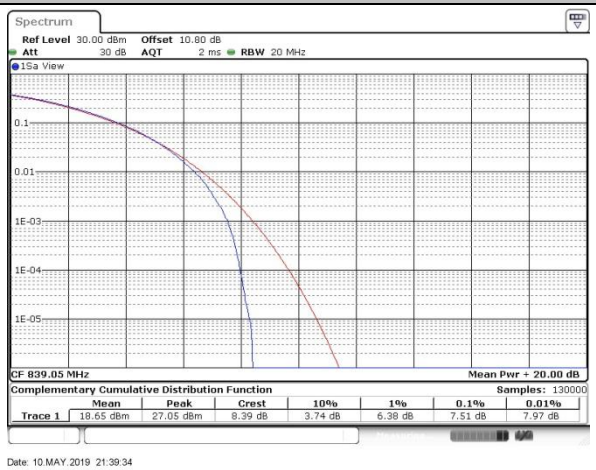
LTE Band 5 / 10MHz +10MHz / QPSK	
Lowest Channel / 1RB0_1RBmax	**Lowest Channel / 1RBmax_1RB0**
	
Middle Channel / 1RB0_1RBmax	**Middle Channel / 1RBmax_1RB0**
	
Highest Channel / 1RB0_1RBmax	**Highest Channel / 1RBmax_1RB0**
	

LTE Band 5 / 10MHz +10MHz / QPSK	
Lowest Channel / Full RB	
	**Intentionally blank**
Middle Channel / Full RB	
	**Intentionally blank**
Highest Channel / Full RB	
	**Intentionally blank**

LTE Band 5 / 10MHz +10MHz / 16QAM	
Lowest Channel / 1RB0_1RBmax	**Lowest Channel / 1RBmax_1RB0**
	
Middle Channel / 1RB0_1RBmax	**Middle Channel / 1RBmax_1RB0**
	
Highest Channel / 1RB0_1RBmax	**Highest Channel / 1RBmax_1RB0**
	

LTE Band 5 / 10MHz +10MHz / 16QAM	
Lowest Channel / Full RB	
	**Intentionally blank**
Middle Channel / Full RB	
	**Intentionally blank**
Highest Channel / Full RB	
	**Intentionally blank**

LTE Band 5 / 10MHz +10MHz / 64QAM	
Lowest Channel / 1RB0_1RBmax	**Lowest Channel / 1RBmax_1RB0**
	
Middle Channel / 1RB0_1RBmax	**Middle Channel / 1RBmax_1RB0**
	
Highest Channel / 1RB0_1RBmax	**Highest Channel / 1RBmax_1RB0**
	

LTE Band 5 / 10MHz +10MHz / 64QAM	
Lowest Channel / Full RB	
	**Intentionally blank**
Middle Channel / Full RB	
	**Intentionally blank**
Highest Channel / Full RB	
	**Intentionally blank**

26dB Bandwidth

Mode	LTE Band 5 : 26dB BW(MHz)		
	QPSK		
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	8.17	8.09	14.48
Middle CH	8.10	8.12	14.45
Highest CH	8.10	8.15	14.54
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	14.74	43.32	
Middle CH	14.56	37.22	
Highest CH	14.56	37.22	

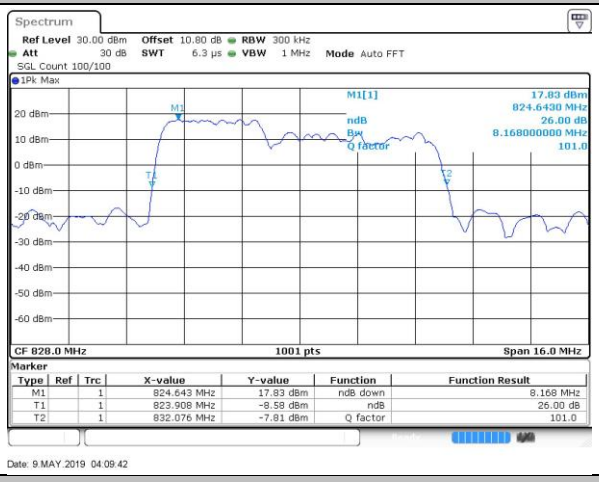
Mode	LTE Band 5 : 26dB BW(MHz)		
	16QAM		
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	8.14	8.18	14.48
Middle CH	8.06	8.15	14.48
Highest CH	8.09	8.09	14.62
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	14.60	38.72	
Middle CH	14.69	36.97	
Highest CH	14.62	34.17	

Mode	LTE Band 5 : 26dB BW(MHz)		
	64QAM		
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	8.09	8.14	14.56
Middle CH	8.07	8.17	14.48
Highest CH	8.06	8.15	14.60
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	14.60	38.77	
Middle CH	14.69	36.87	
Highest CH	14.69	34.23	

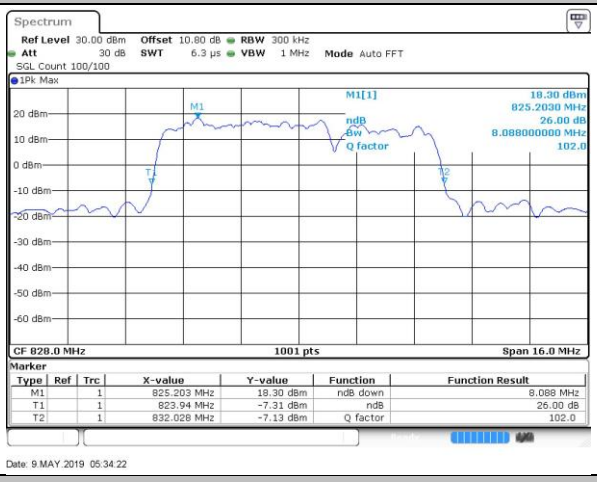
LTE Band 5

QPSK

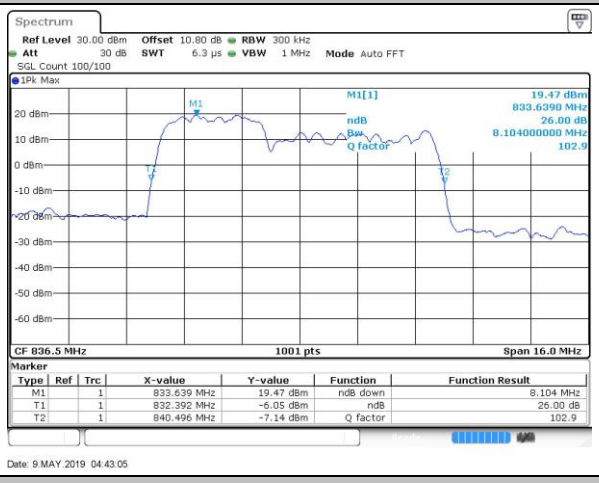
Lowest Channel / 3MHz+5MHz



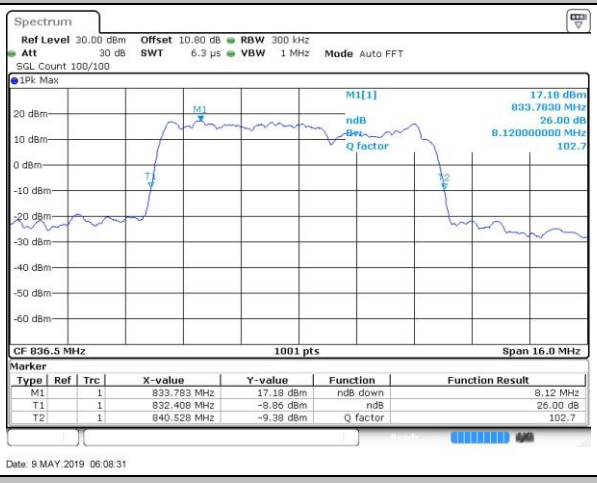
Lowest Channel / 5MHz+3MHz



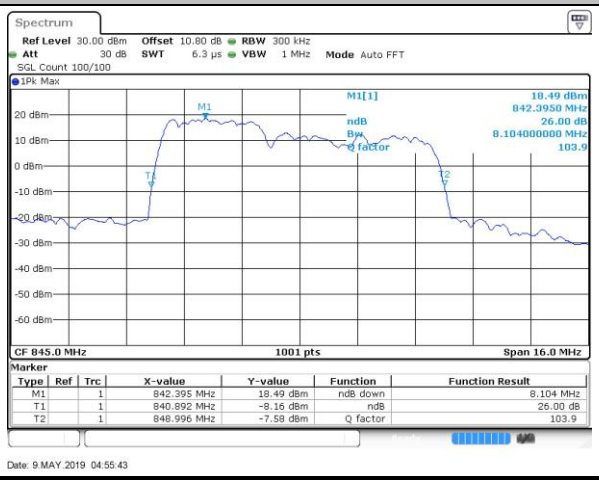
Middle Channel / 3MHz+5MHz



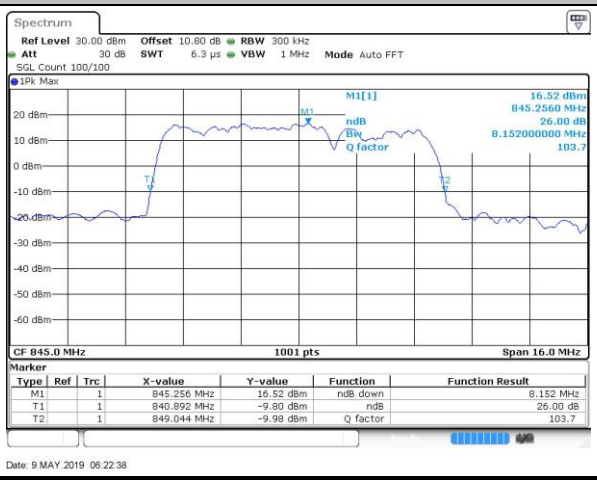
Middle Channel / 5MHz+3MHz



Highest Channel / 3MHz+5MHz



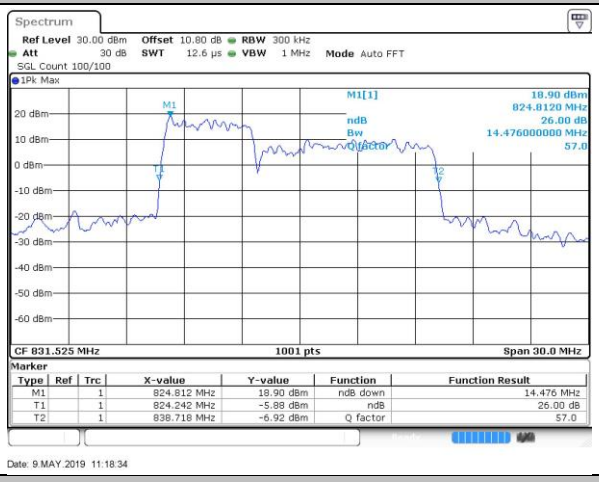
Highest Channel / 5MHz+3MHz



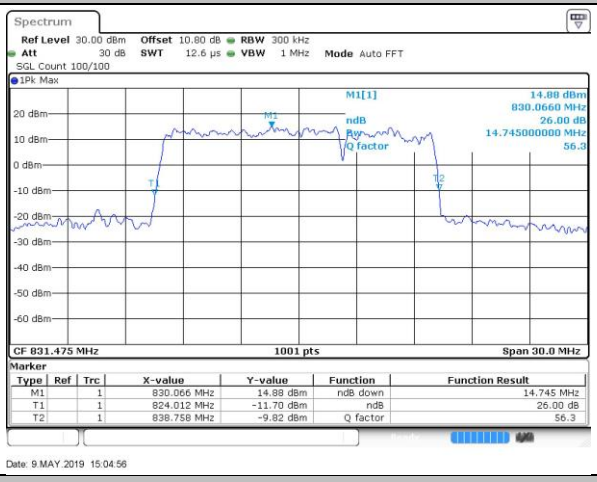
LTE Band 5

QPSK

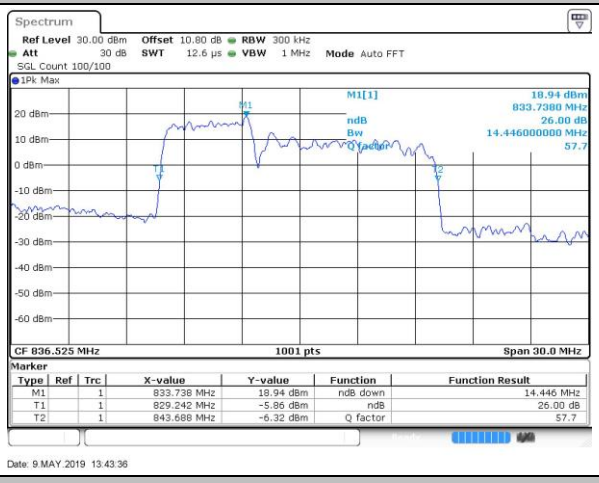
Lowest Channel / 5MHz+10MHz



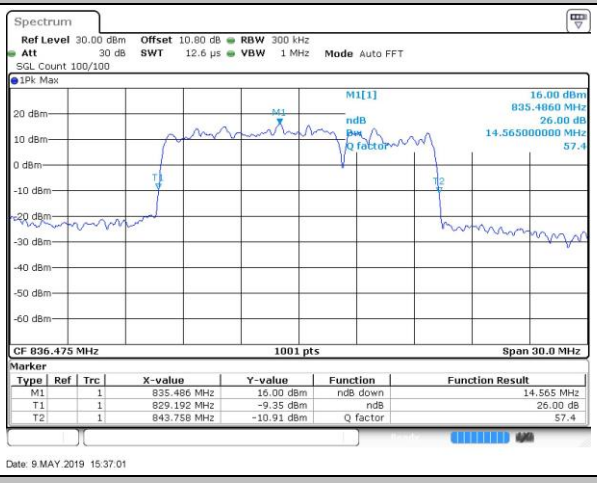
Lowest Channel / 10MHz+5MHz



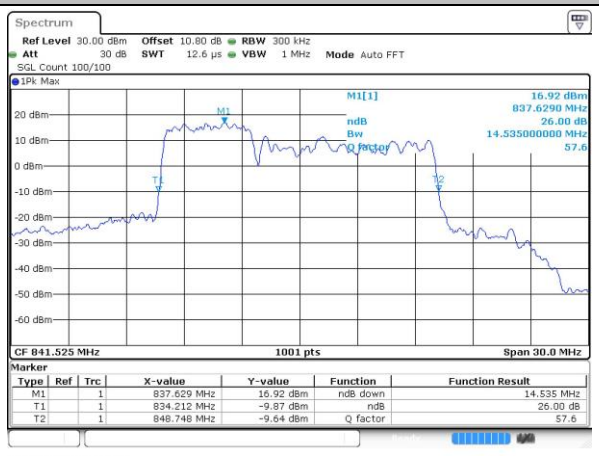
Middle Channel / 5MHz+10MHz



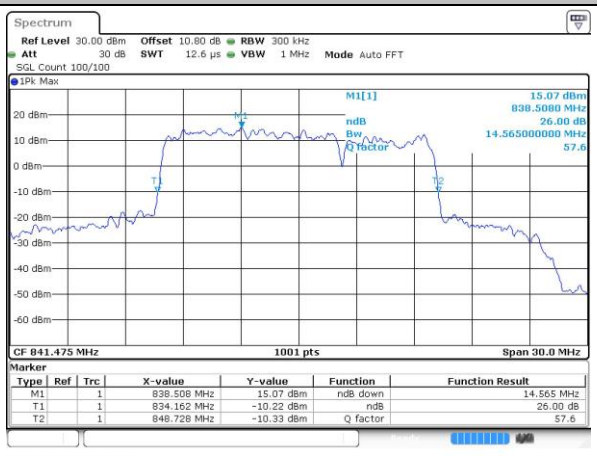
Middle Channel / 10MHz+5MHz



Highest Channel / 5MHz+10MHz



Highest Channel / 10MHz+5MHz



LTE Band 5
QPSK
Lowest Channel / 10MHz+10MHz

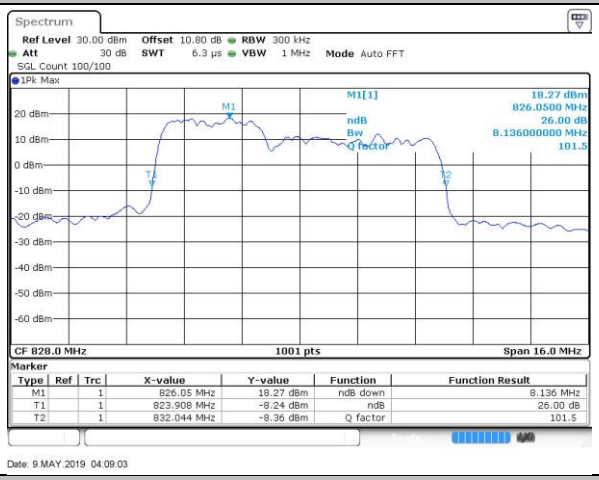
Middle Channel / 10MHz+10MHz

Highest Channel / 10MHz+10MHz

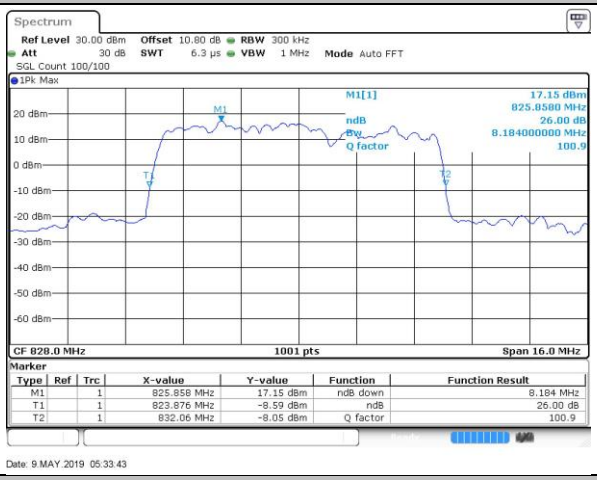
LTE Band 5

16QAM

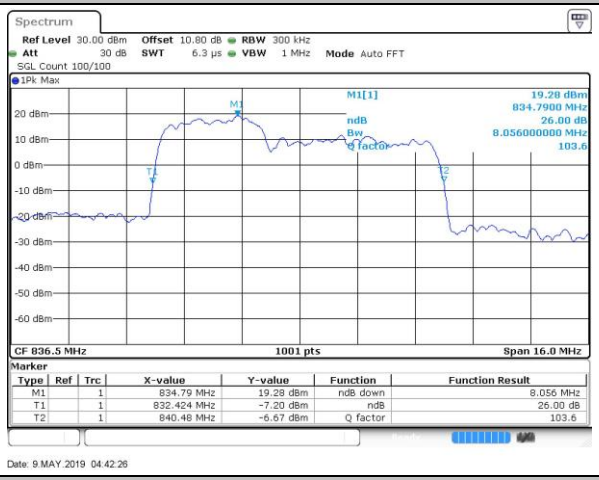
Lowest Channel / 3MHz+5MHz



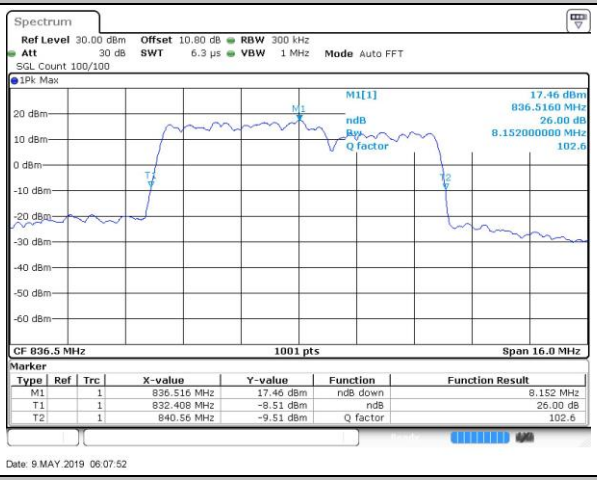
Lowest Channel / 5MHz+3MHz



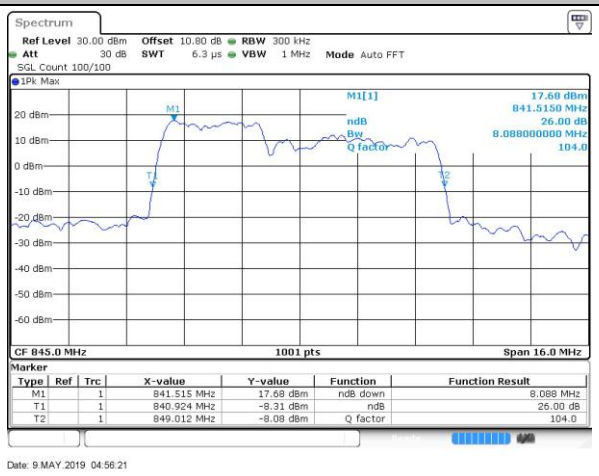
Middle Channel / 3MHz+5MHz



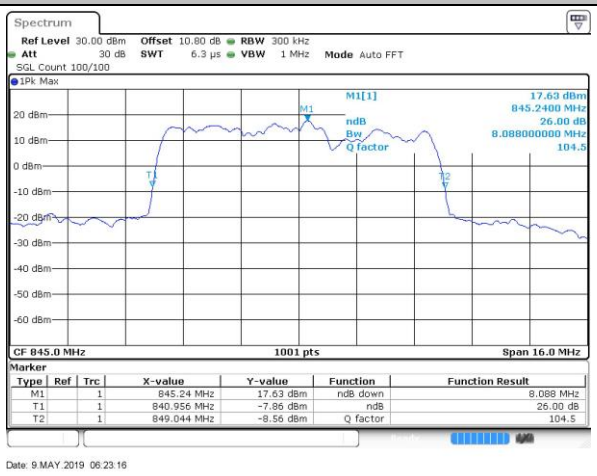
Middle Channel / 5MHz+3MHz



Highest Channel / 3MHz+5MHz



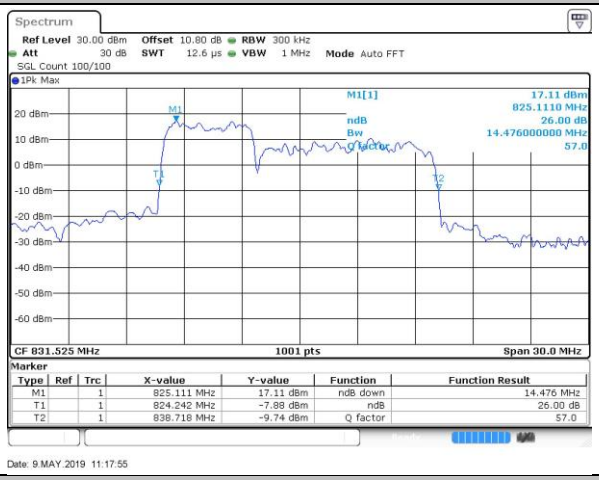
Highest Channel / 5MHz+3MHz



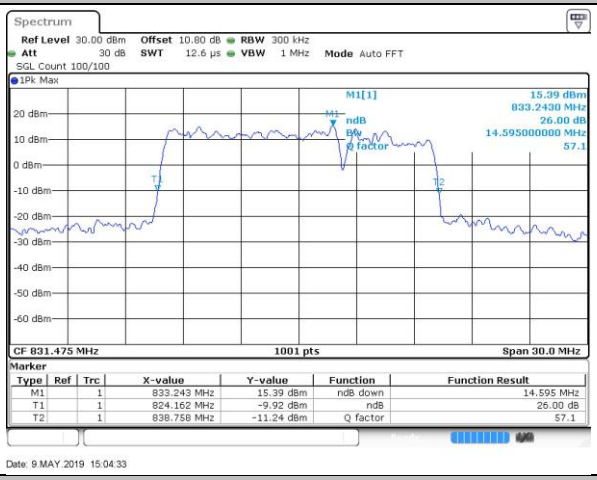
LTE Band 5

16QAM

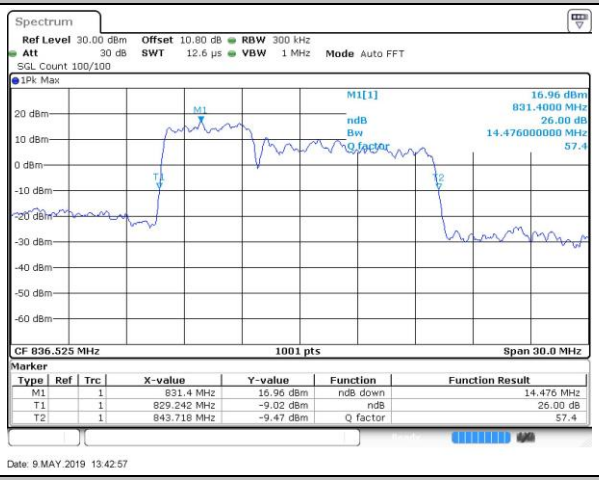
Lowest Channel / 5MHz+10MHz



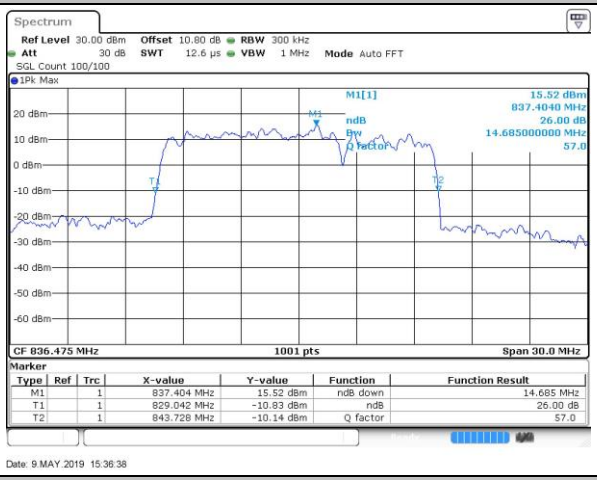
Lowest Channel / 10MHz+5MHz



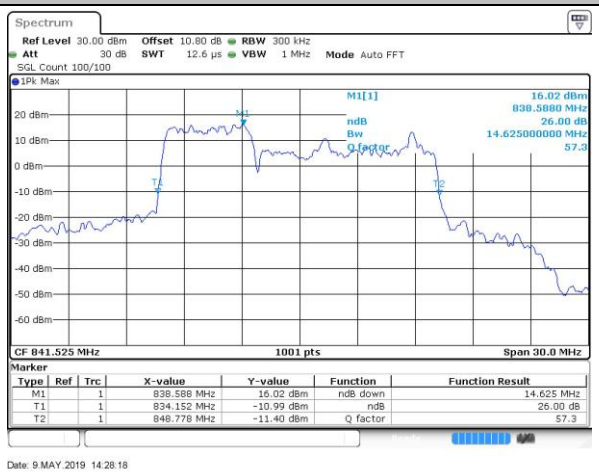
Middle Channel / 5MHz+10MHz



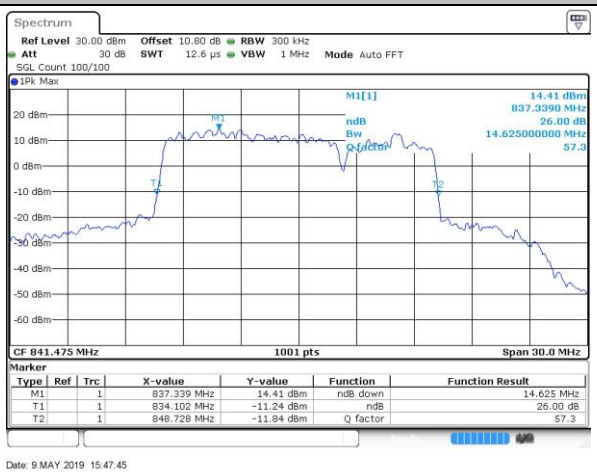
Middle Channel / 10MHz+5MHz



Highest Channel / 5MHz+10MHz

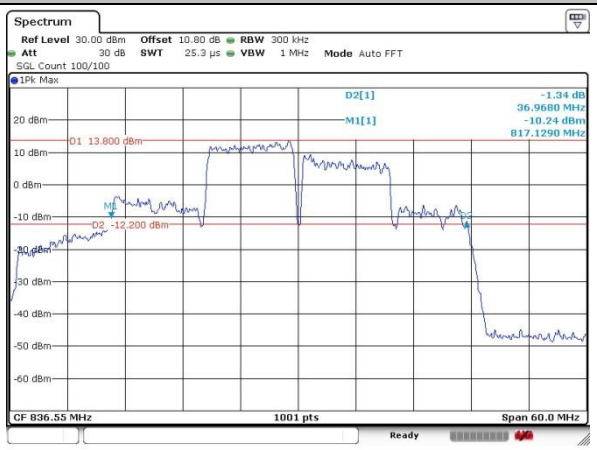


Highest Channel / 10MHz+5MHz



LTE Band 5
16QAM
Lowest Channel / 10MHz+10MHz

Middle Channel / 10MHz+10MHz

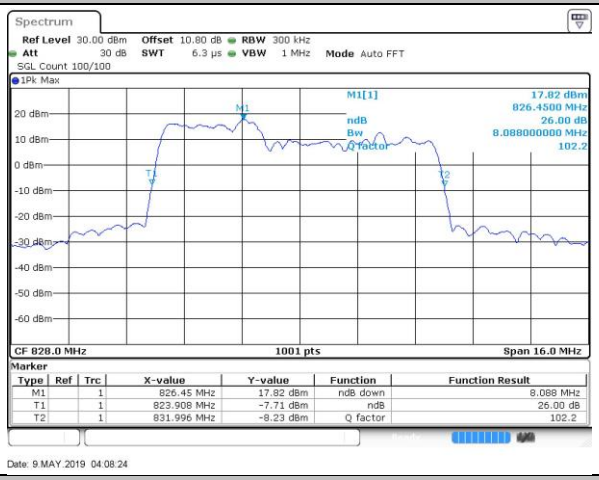


Highest Channel / 10MHz+10MHz

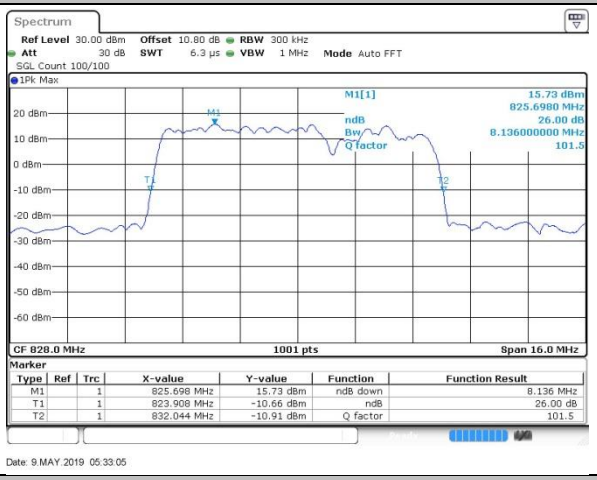
LTE Band 5

64QAM

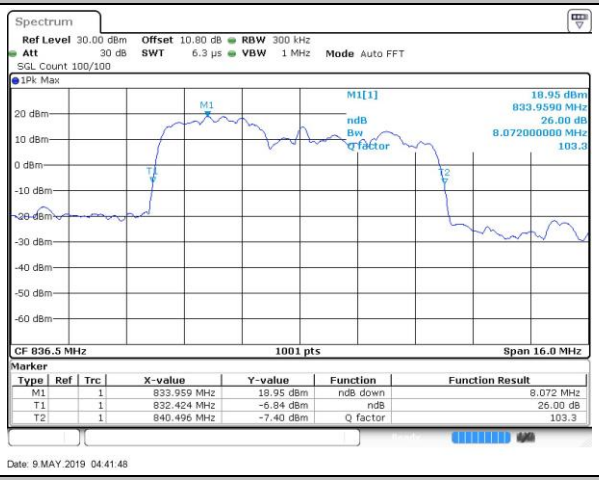
Lowest Channel / 3MHz+5MHz



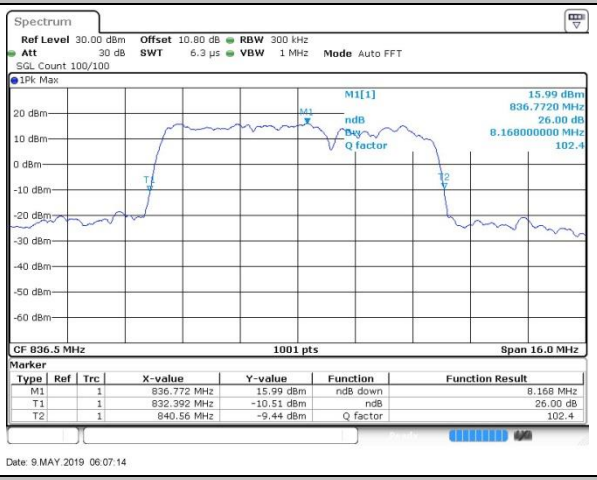
Lowest Channel / 5MHz+3MHz



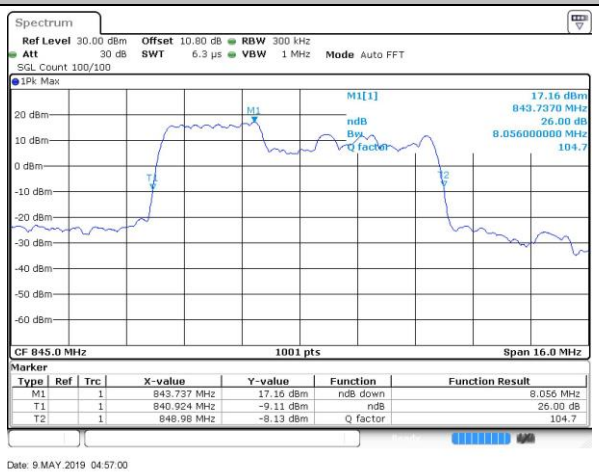
Middle Channel / 3MHz+5MHz



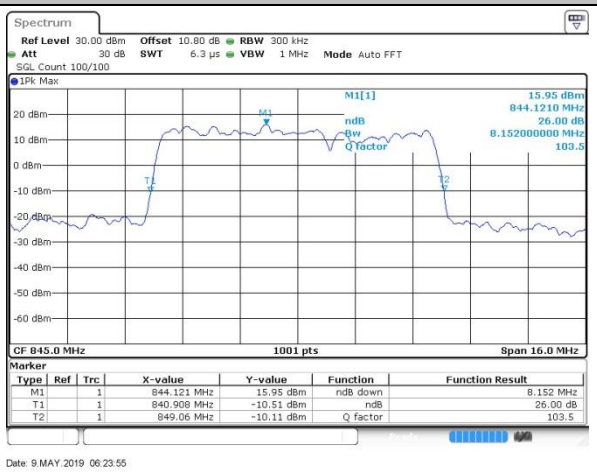
Middle Channel / 5MHz+3MHz



Highest Channel / 3MHz+5MHz



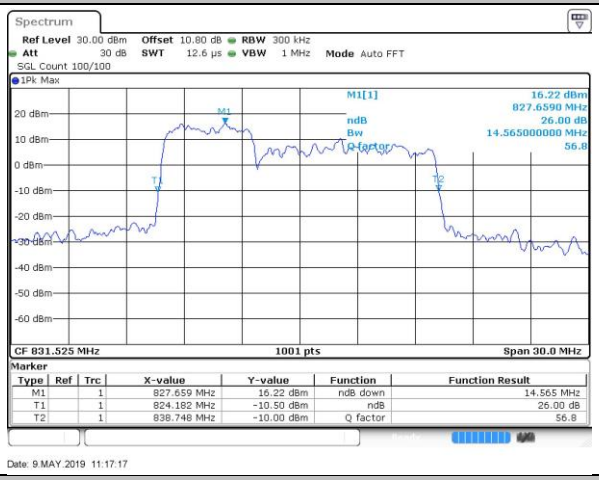
Highest Channel / 5MHz+3MHz



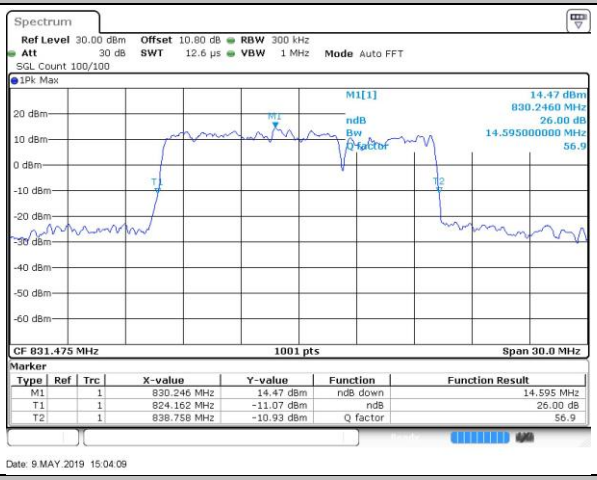
LTE Band 5

64QAM

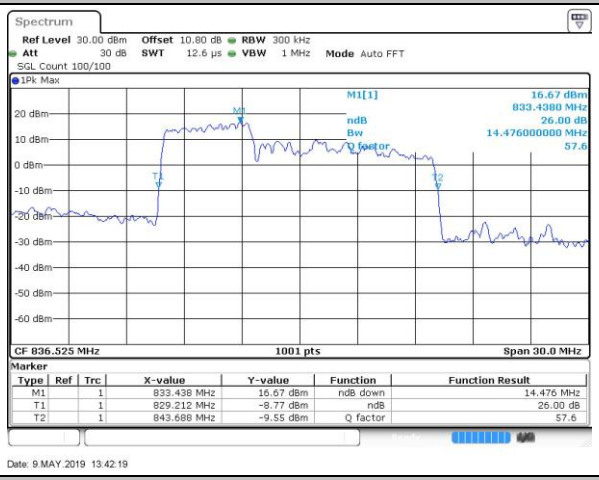
Lowest Channel / 5MHz+10MHz



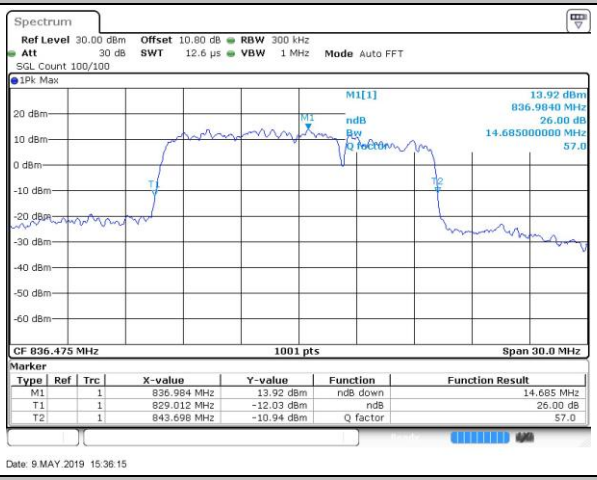
Lowest Channel / 10MHz+5MHz



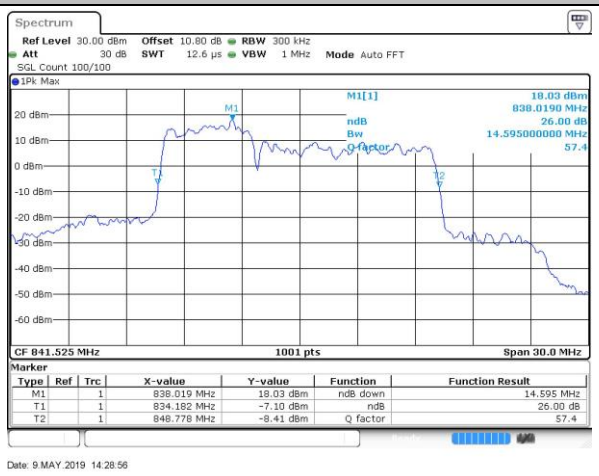
Middle Channel / 5MHz+10MHz



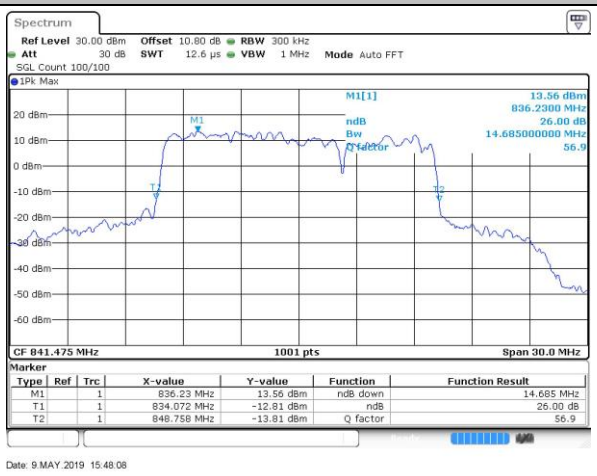
Middle Channel / 10MHz+5MHz



Highest Channel / 5MHz+10MHz



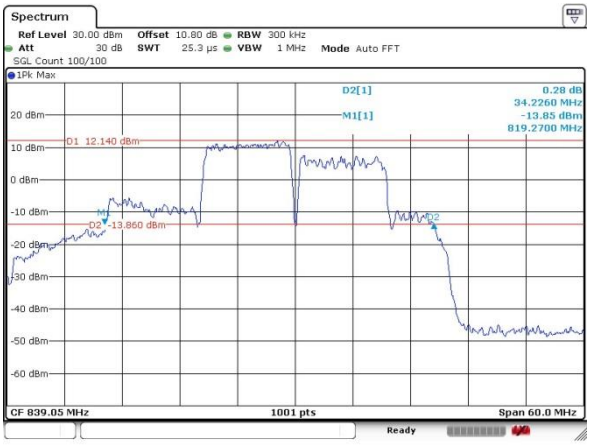
Highest Channel / 10MHz+5MHz



LTE Band 5
64QAM
Lowest Channel / 10MHz+10MHz

Middle Channel / 10MHz+10MHz

Highest Channel / 10MHz+10MHz



Occupied Bandwidth

Mode	LTE Band 5 : 99%OBW(MHz)		
QPSK			
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	7.53	7.51	13.82
Middle CH	7.43	7.53	13.70
Highest CH	7.46	7.50	13.82
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	13.79	18.91	
Middle CH	13.76	18.88	
Highest CH	13.91	18.94	

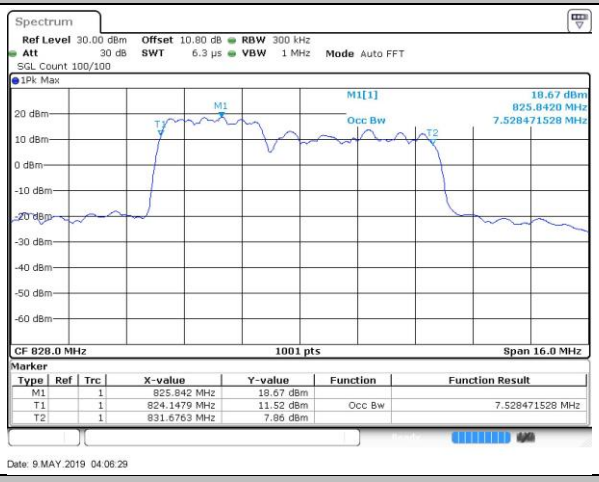
Mode	LTE Band 5 : 99%OBW(MHz)		
16QAM			
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	7.53	7.59	13.79
Middle CH	7.50	7.53	13.67
Highest CH	7.50	7.59	13.67
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	13.88	18.76	
Middle CH	13.85	18.88	
Highest CH	13.97	18.82	

Mode	LTE Band 5 : 99%OBW(MHz)		
64QAM			
BW	3MHz+5MHz	5MHz+3MHz	5MHz+10MHz
Lowest CH	7.54	7.48	13.88
Middle CH	7.53	7.45	13.67
Highest CH	7.50	7.59	13.76
BW	10MHz+5MHz	10MHz+10MHz	
Lowest CH	13.85	18.70	
Middle CH	13.79	18.82	
Highest CH	13.94	18.64	

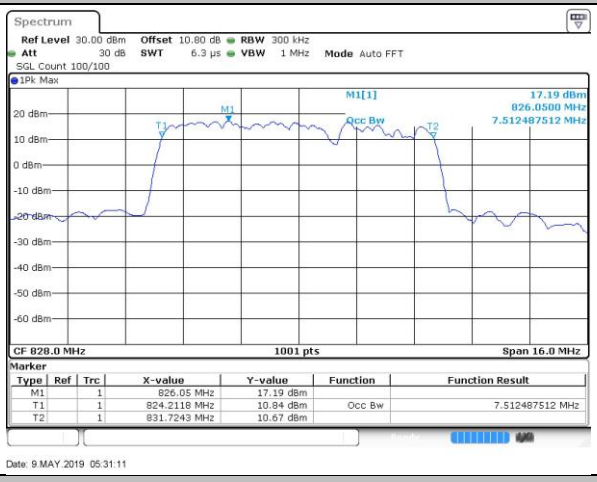
LTE Band 5

QPSK

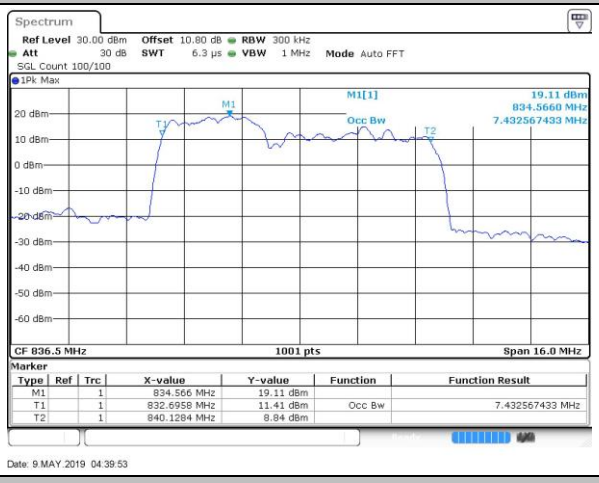
Lowest Channel / 3MHz+5MHz



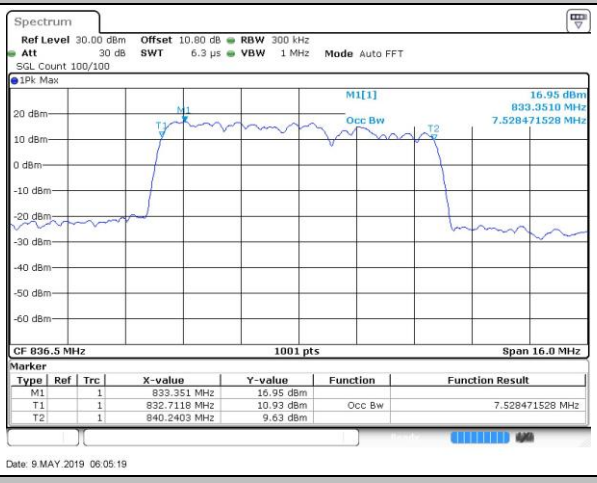
Lowest Channel / 5MHz+3MHz



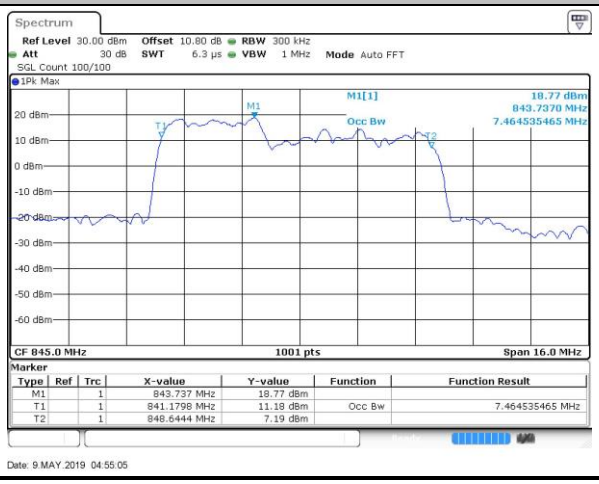
Middle Channel / 3MHz+5MHz



Middle Channel / 5MHz+3MHz



Highest Channel / 3MHz+5MHz



Highest Channel / 5MHz+3MHz