FCC RADIO TEST REPORT

FCC ID	**:**	**ZL5B35EPA**
Equipment	**:**	**Mobile Phone**
Brand Name	**:**	**CAT**
Model Name	**:**	**B35**
Standard	**:**	**47 CFR Part 2, 27**

The product was received on Dec. 10, 2019 and testing was started from Dec. 24, 2019 and completed on Feb. 12, 2020. We, Sporton International (Kunshan) 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 A2LA 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED
Cert #5145.02

Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FG9D1021-02B	01	Initial issue of report	Mar. 02, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 7)		
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	Pass	-
3.5	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 7)	Pass	-
3.6	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 7)	Pass	-
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1051 §27.53 (m)(4)	Radiated Spurious Emission (Band 7)	Pass	Under limit 10.73 dB at 7580.000 MHz

Remark:

1. Not required means after assessing, test items are not necessary to carry out.

2. This is a variant report which can be referred Product Equality Declaration. All the test cases were performed on original report which can be referred to Sporton Report Number FG840307-04B. Based on the original report, the test cases were verified.

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.

1 General Description

1.1 Applicant

Bullitt Group
One Valpy, Valpy Street, Reading, Berkshire, England RG1 1AR

1.2 Manufacturer

Bullitt Group
One Valpy, Valpy Street, Reading, Berkshire, England RG1 1AR

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	CAT
Model Name	B35
FCC ID	ZL5B35EPA
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/ HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth BR/EDR/LE
HW Version	MP_NZ
SW Version	LTE_0208120.0_B35_53
EUT Stage	Identical Prototype

Note: There are four types of EUT: Sample 1 is dual SIM with main source receiver, Sample 2 is dual SIM with second source receiver, Sample 3 is single SIM with main source receiver, Sample 4 is single SIM with second source receiver, just different suppliers. According to the difference, we choose sample 1 to full test.

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz
Rx Frequency	LTE Band 7 : 2622.5MHz ~ 2687.5 MHz
Bandwidth	LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 7 : 21.07 dBm
Antenna Gain	LTE Band 7 : 0.50 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

LTE Band 7		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
5	2502.5 ~ 2567.5	4M51G7D	-	0.1419	4M52W7D	-	0.1045
10	2505.0 ~ 2565.0	9M09G7D	0.0032	0.1374	8M99W7D	-	0.1117
15	2507.5 ~ 2562.5	13M4G7D	-	0.1419	13M5W7D	-	0.1094
20	2510.0 ~ 2560.0	18M3G7D	-	0.1435	18M3W7D	-	0.1117

1.7 Testing Location

Test Site	Sporton International (Kunshan) Inc.	
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	**Sporton Site No.**	
	TH01-KS	03CH04--KS
Test Engineer	Levi zhao	Bonner Qian
Temperature	21~25℃	22~23℃
Relative Humidity	41~45%	41~42%

FCC designation No.: CN1257

FCC Test Site Registration No.: 314309

1.8 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, 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 414788 D01 Radiated Test Site 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

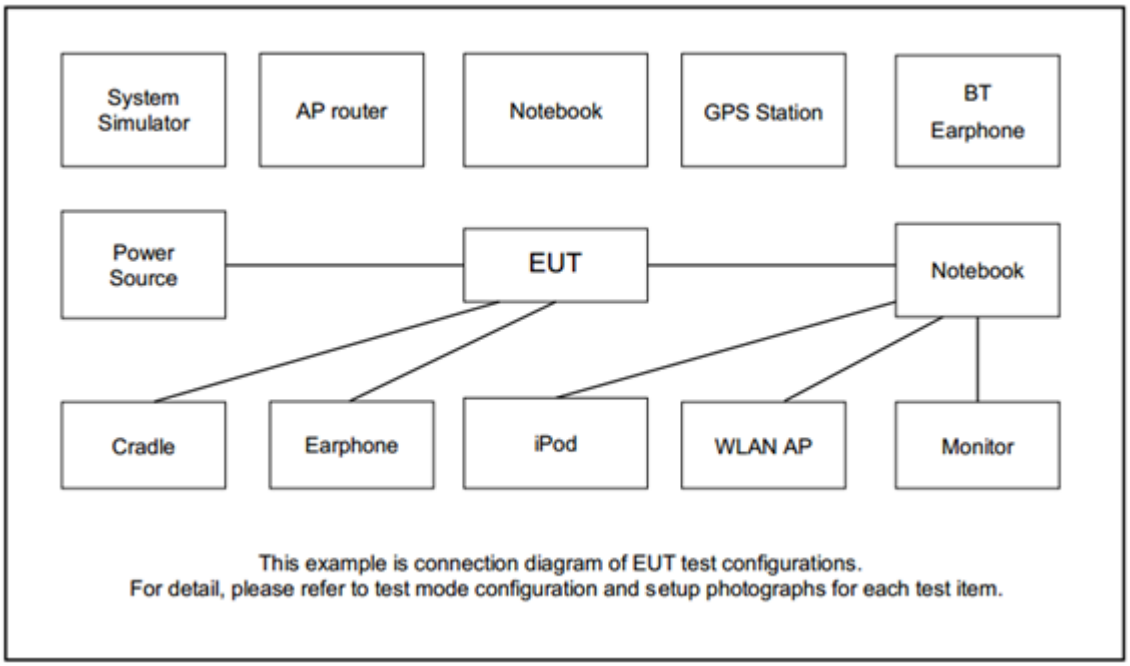
2.1 Test Mode

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) 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	7	-	-	v	v	v	v	v	v	-	v	v	v	v	v	v
Peak-to-Average Ratio	7	-	-				v	v	v	-	v		v	v	v	v
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v	-			v	v	v	v
Conducted Band Edge	7	-	-	v	v	v	v	v	v	-	v		v	v		v
Conducted Spurious Emission	7	-	-	v	v	v	v	v	v	-	v			v	v	v
Frequency Stability	7	-	-		v			v		-			v		v	
E.I.R.P	7	-	-	v	v	v	v	v	v	-	v			v	v	v
Radiated Spurious Emission	7	Worst Case													v	
Note	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.	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 7 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
15	Channel	20825	21100	21375
	Frequency	2507.5	2535	2562.5
10	Channel	20800	21100	21400
	Frequency	2505	2535	2565
5	Channel	20775	21100	21425
	Frequency	2502.5	2535	2567.5

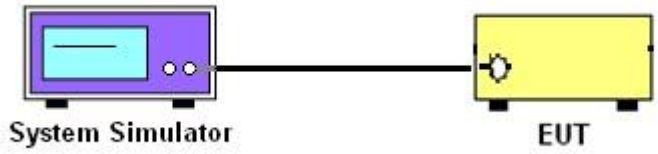
3 Conducted Test Items

3.1 Measuring Instruments

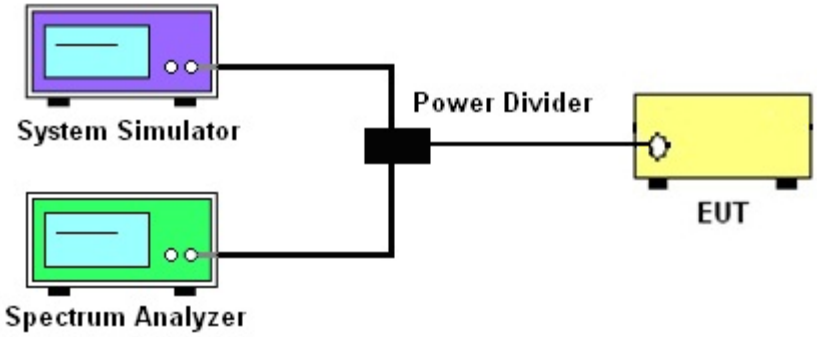
See list of measuring instruments of this test report.

3.1.1 Test Setup

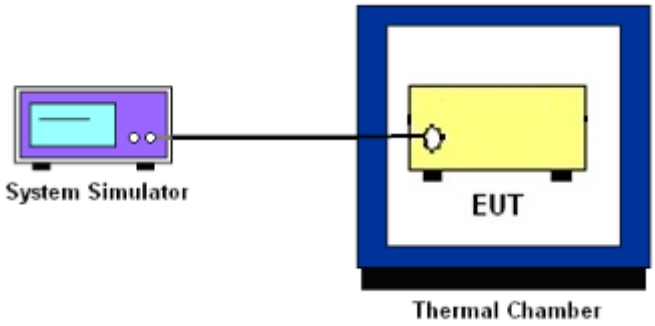
3.1.2 Conducted Output Power



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 EIRP

3.2.1 Description of the Conducted Output Power Measurement and 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 EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 7

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

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 6.1.

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)
   For LTE Band 7
   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 LTE Band 7

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 6.1.

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)

   For LTE Band 7

   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

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.

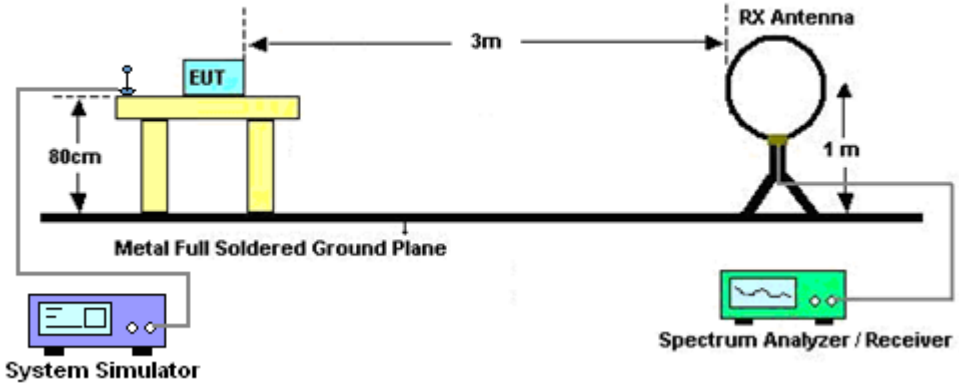
4 Radiated Test Items

4.1 Measuring Instruments

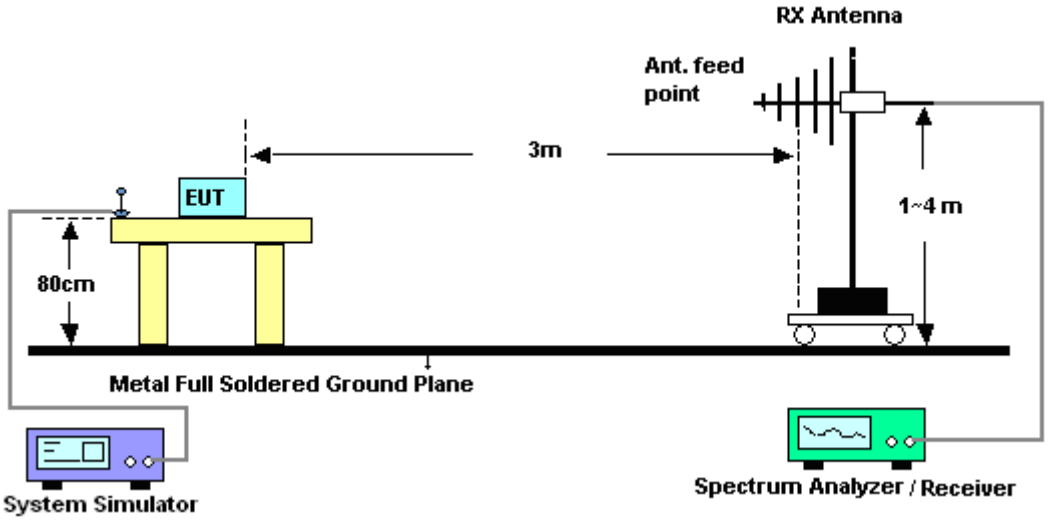
See list of measuring instruments of this test report.

4.1.1 Test Setup

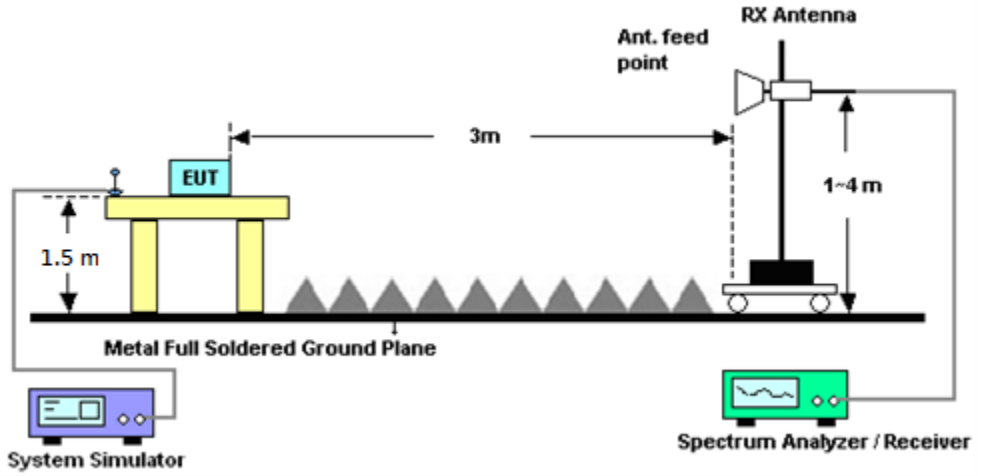
For radiated emissions below 30MHz



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.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

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.

For LTE Band 7

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.

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 7 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)

    For LTE Band 7

    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
Spectrum Analyzer	R&S	FSV40	KS150209JCGS01	101040	Nov. 02, 2019	Feb. 12, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8820C	KS141204JCGS05	6201432830	Jan. 14, 2019	Jan. 08, 2020	Jan. 13, 2020	Conducted (TH01-KS)
DC Power Supply	GW INSTEK	GPS-3030D	KS071211JCGS01	EI884515	Aug. 02, 2019	Feb. 12, 2020	Aug. 01, 2020	Conducted (TH01-KS)
Radio communication analyzer	Anritsu	MT8821C	K180502JGE01	6261806798	Apr. 16, 2019	Feb. 12, 2020	Apr. 15, 2020	Conducted (TH01-KS)
Temperature & humidity chamber	Hongzhan	LP-150U	KS140413JCGS01	H2014011440	Jul. 04, 2019	Feb. 12, 2020	Jul. 03, 2020	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz-44GHz	Apr. 16, 2019	Dec. 24, 2019	Apr. 15, 2020	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz-1GHz	Apr. 19, 2019	Dec. 24, 2019	Apr. 18, 2020	Radiation (03CH04-KS)
Broad-Band Horn Antenna	Schwarzbeck MESS-ELEKTRONIK	BBHA9120D	01648	1GHz~18GHz	Jan. 27, 2019	Dec. 24, 2019	Jan. 26, 2020	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz Gain 32dB	Aug. 06, 2019	Dec. 24, 2019	Aug. 05, 2020	Radiation (03CH04-KS)
EMI Test Receiver	Keysight	N9038A	MY56400023	3Hz~8.5GHz;Max 30dBm	Jul. 18, 2019	Dec. 24, 2019	Jul. 17, 2020	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101093	18GHz~40GHz	Feb. 23, 2019	Dec. 24, 2019	Feb. 22, 2020	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2012228	1Ghz-18Ghz	Aug. 16, 2019	Dec. 24, 2019	Aug. 15, 2020	Radiation (03CH04-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz,45dB Min	Jan. 14, 2019	Dec. 24, 2019	Jan. 13, 2020	Radiation (03CH04-KS)

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))	**3.3**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	20.68	20.74	20.72
20	1	49		21.01	21.07	21.01
20	1	99		20.80	20.75	20.65
20	50	0		19.89	20.00	19.90
20	50	24		20.01	20.09	19.79
20	50	50		20.02	20.03	19.85
20	100	0		19.96	19.87	19.81
20	1	0	16-QAM	19.56	19.64	19.68
20	1	49		19.98	19.58	19.82
20	1	99		19.53	19.76	19.56
20	50	0		18.93	19.03	18.96
20	50	24		19.04	19.03	19.00
20	50	50		19.06	19.12	18.82
20	100	0		19.00	18.97	18.85
15	1	0	QPSK	20.66	20.75	20.83
15	1	37		21.02	20.77	20.95
15	1	74		21.02	20.97	20.78
15	36	0		19.93	19.92	19.84
15	36	20		20.05	19.89	19.86
15	36	39		20.07	19.91	19.80
15	75	0		19.89	19.89	19.80
15	1	0	16-QAM	19.54	19.54	19.61
15	1	37		19.86	19.60	19.40
15	1	74		19.89	19.56	19.40
15	36	0		18.90	18.89	18.99
15	36	20		19.11	19.04	18.98
15	36	39		19.05	19.01	18.94
15	75	0		18.92	18.93	18.85

LTE Band 7 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	20.49	20.71	20.52
10	1	25		20.88	20.67	20.68
10	1	49		20.73	20.74	20.72
10	25	0		19.75	19.73	19.72
10	25	12		19.90	19.84	19.77
10	25	25		19.91	19.81	19.72
10	50	0		19.78	19.79	19.79
10	1	0	16-QAM	19.78	19.78	19.56
10	1	25		19.98	19.65	19.54
10	1	49		19.78	19.64	19.57
10	25	0		18.92	18.97	18.84
10	25	12		18.94	19.05	18.92
10	25	25		18.89	18.95	18.86
10	50	0		18.78	18.84	18.86
5	1	0	QPSK	20.83	20.82	20.74
5	1	12		20.71	21.02	20.83
5	1	24		20.71	20.85	20.74
5	12	0		19.92	19.78	19.80
5	12	7		19.84	19.83	19.84
5	12	13		19.91	19.79	19.73
5	25	0		19.77	19.86	19.77
5	1	0	16-QAM	19.54	19.20	19.35
5	1	12		19.23	19.67	19.33
5	1	24		19.69	19.60	19.20
5	12	0		18.99	18.73	18.84
5	12	7		18.86	18.95	18.86
5	12	13		19.19	18.89	18.87
5	25	0		18.79	18.89	18.92

ERP/EIRP

LTE Band 7 (GT - LC = 0.50 dBi) QPSK						
Bandwidth	5M			10M		
Channel	20775	21100	21425	20800	21100	21400
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2502.5	2535	2567.5	2505	2535	2565
Conducted Power (dBm)	20.71	21.02	20.83	20.88	20.67	20.68
Conducted Power (Watts)	0.1178	0.1265	0.1211	0.1225	0.1167	0.1169
EIRP(dBm)	21.21	21.52	21.33	21.38	21.17	21.18
EIRP(Watts)	0.1321	0.1419	0.1358	0.1374	0.1309	0.1312

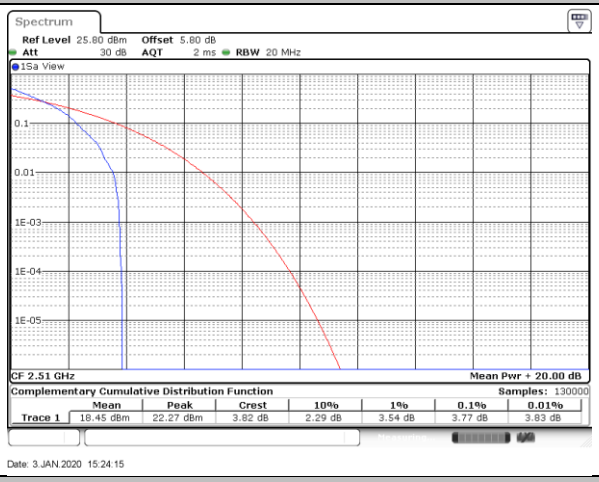
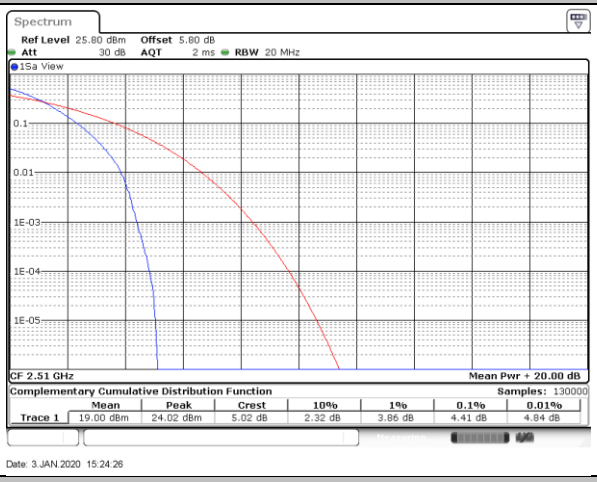
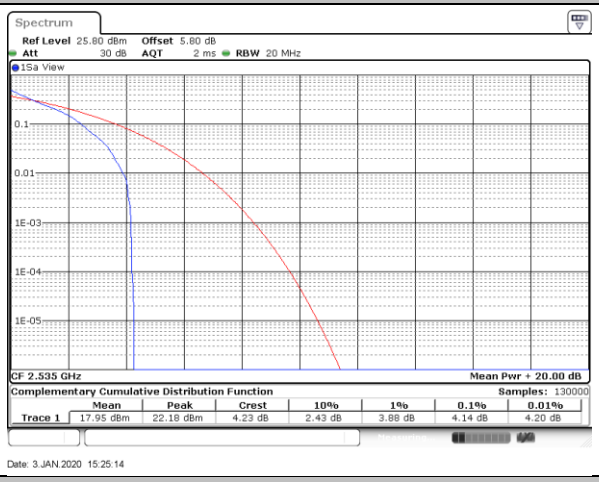
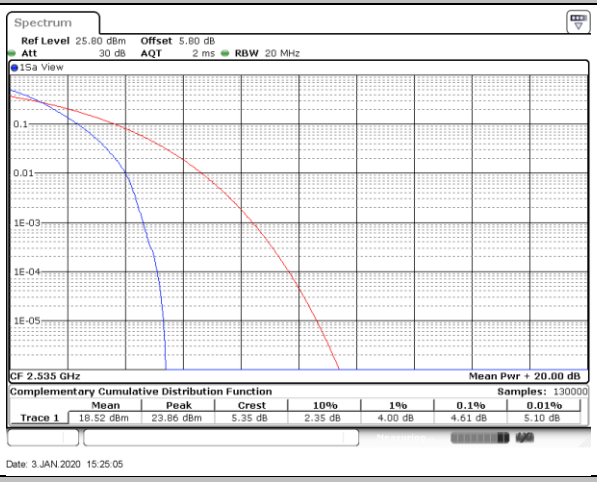
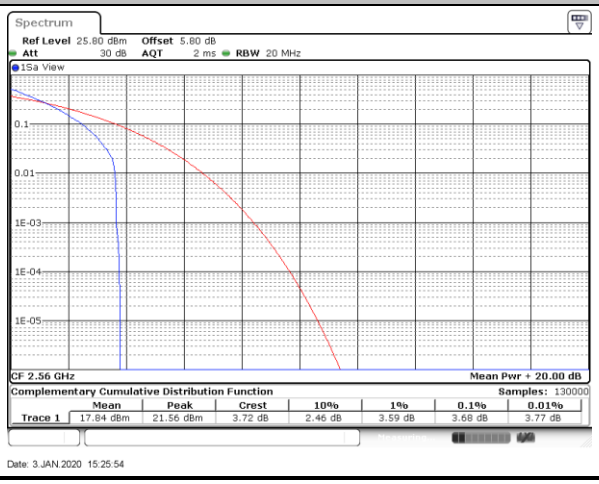
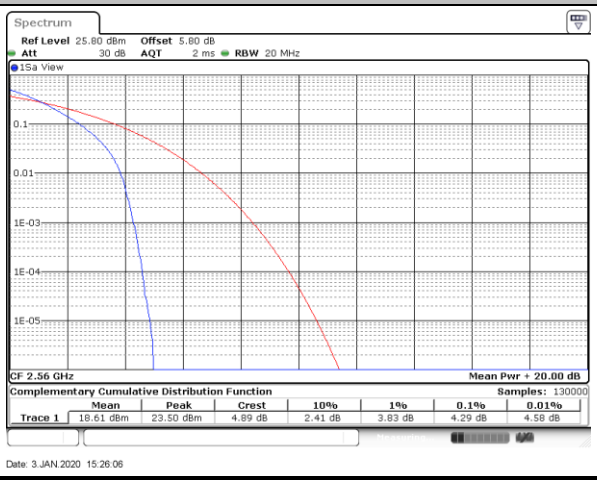
LTE Band 7 (GT - LC = 0.50 dBi) QPSK						
Bandwidth	15M			20M		
Channel	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2507.5	2535	2562.5	2510	2535	2560
Conducted Power (dBm)	21.02	20.77	20.95	21.01	21.07	21.01
Conducted Power (Watts)	0.1265	0.1194	0.1245	0.1262	0.1279	0.1262
EIRP(dBm)	21.52	21.27	21.45	21.51	21.57	21.51
EIRP(Watts)	0.1419	0.1340	0.1396	0.1416	0.1435	0.1416

LTE Band 7 (GT - LC = 0.50 dBi) 16QAM						
Bandwidth	5M			10M		
Channel	20775	21100	21425	20800	21100	21400
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2502.5	2535	2567.5	2505	2535	2565
Conducted Power (dBm)	19.69	19.60	19.20	19.98	19.65	19.54
Conducted Power (Watts)	0.0931	0.0912	0.0832	0.0995	0.0923	0.0899
EIRP(dBm)	20.19	20.10	19.70	20.48	20.15	20.04
EIRP(Watts)	0.1045	0.1023	0.0933	0.1117	0.1035	0.1009

LTE Band 7 (GT - LC = 0.50 dBi) 16QAM						
Bandwidth	15M			20M		
Channel	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	2507.5	2535	2562.5	2510	2535	2560
Conducted Power (dBm)	19.89	19.56	19.40	19.98	19.58	19.82
Conducted Power (Watts)	0.0975	0.0904	0.0871	0.0995	0.0908	0.0959
EIRP(dBm)	20.39	20.06	19.90	20.48	20.08	20.32
EIRP(Watts)	0.1094	0.1014	0.0977	0.1117	0.1019	0.1076

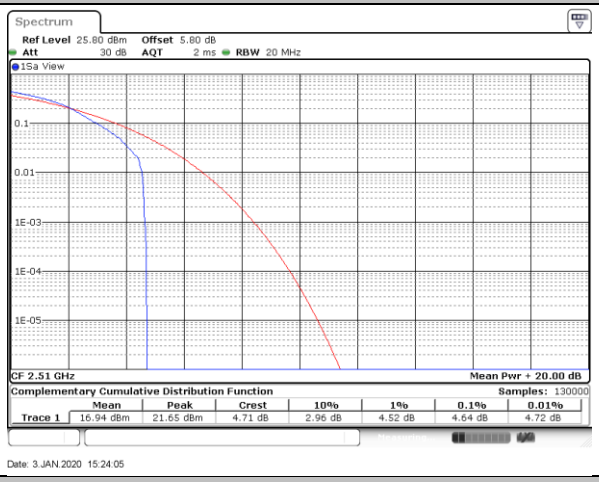
Peak-to-Average Ratio

Mode	LTE Band 7 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	3.77	4.41	4.64	5.42	PASS
Middle CH	4.14	4.61	4.90	5.62	
Highest CH	3.68	4.29	4.70	5.28	

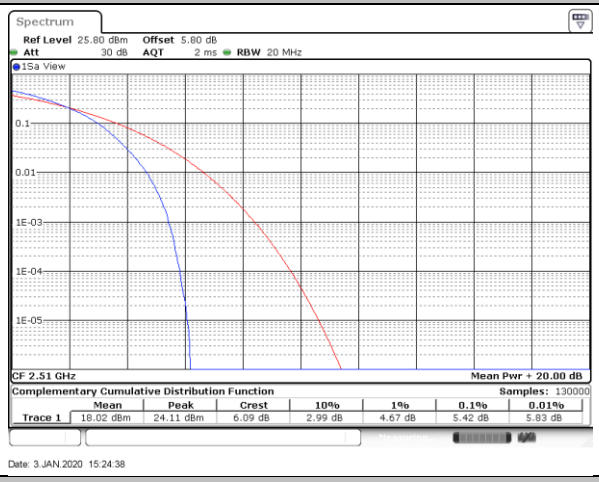
LTE Band 7 / 20MHz / QPSK	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

LTE Band 7 / 20MHz / 16QAM

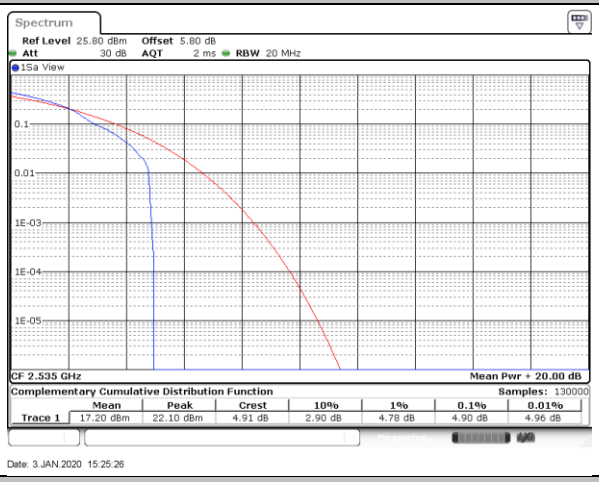
Lowest Channel / 1RB



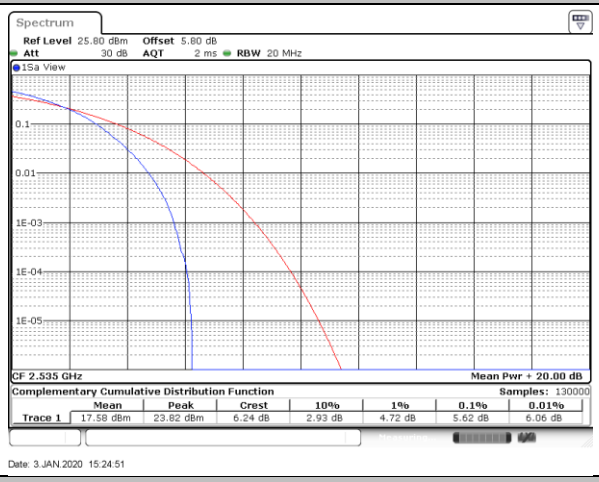
Lowest Channel / Full RB



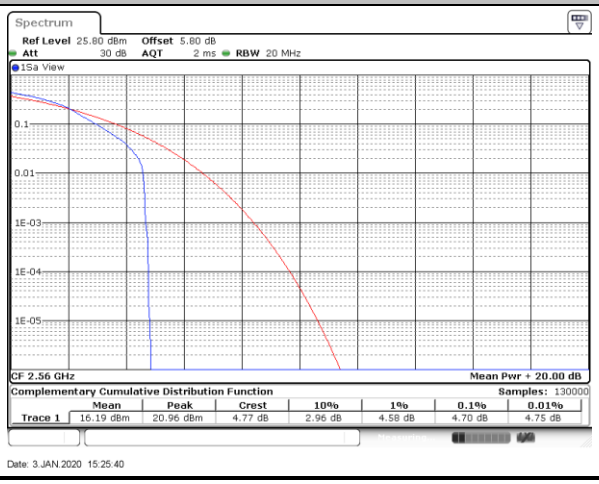
Middle Channel / 1RB



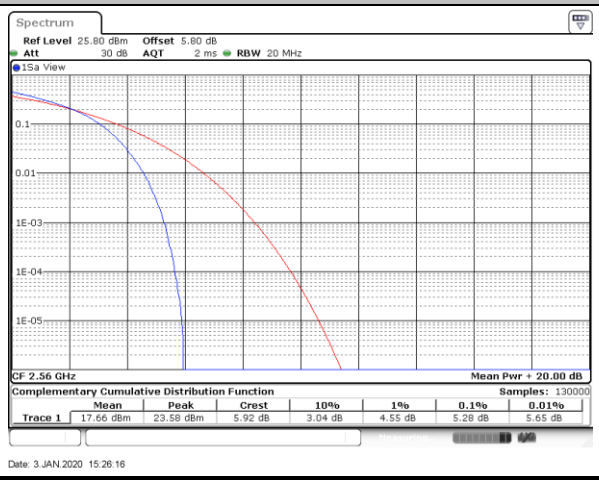
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB

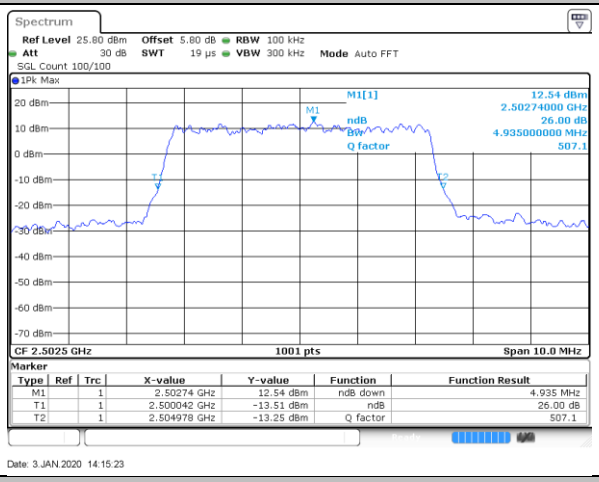


26dB Bandwidth

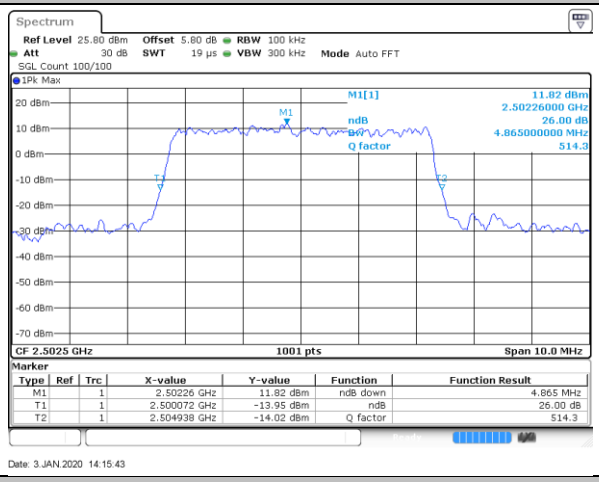
Mode	LTE Band 7 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.935	4.865	10.01	9.91	14.386	14.476	20.06	20.26
Middle CH	-	-	-	-	4.985	4.945	9.89	9.75	14.146	14.416	20.18	20.14
Highest CH	-	-	-	-	4.915	4.935	9.71	9.67	14.685	14.505	20.22	20.06

LTE Band 7

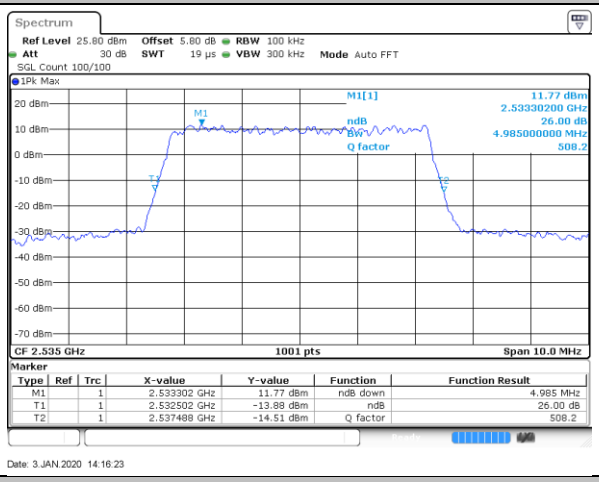
Lowest Channel / 5MHz / QPSK



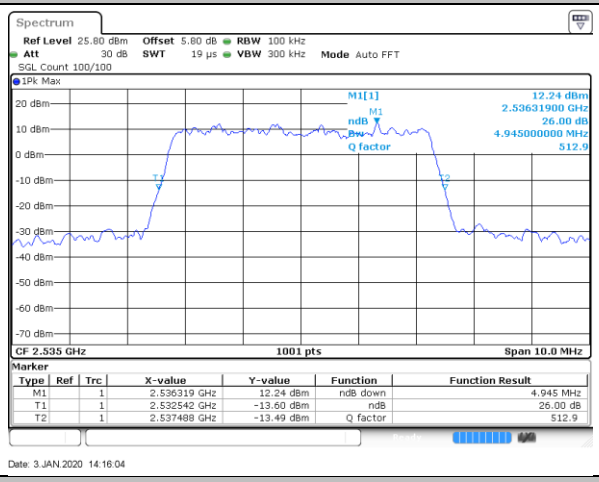
Lowest Channel / 5MHz / 16QAM



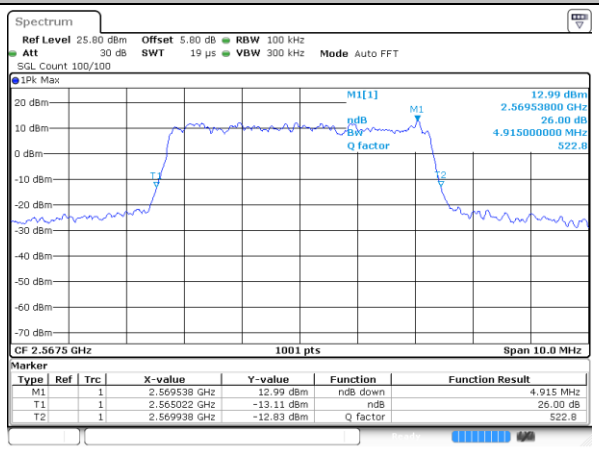
Middle Channel / 5MHz / QPSK



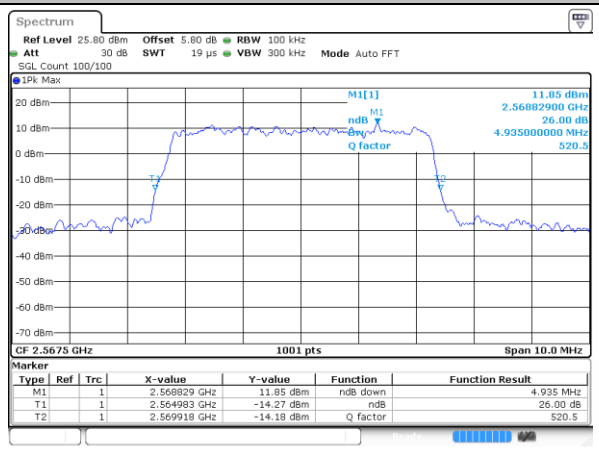
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

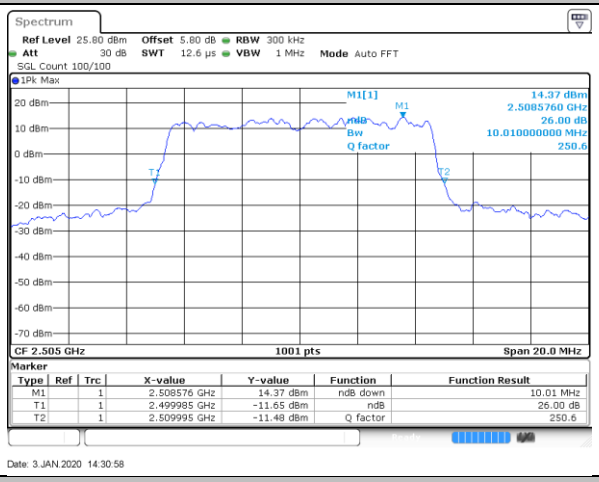


Highest Channel / 5MHz / 16QAM

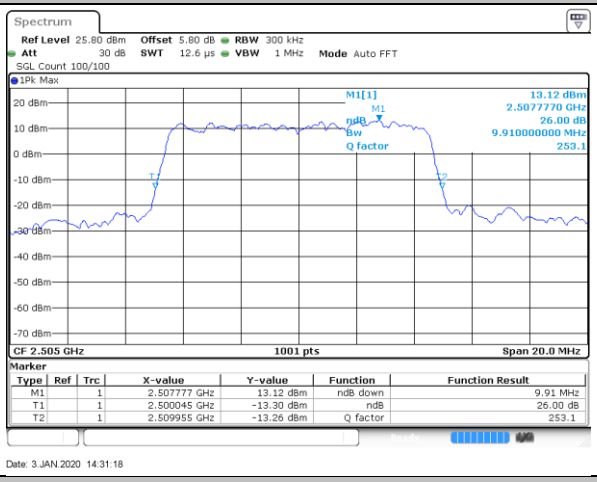


LTE Band 7

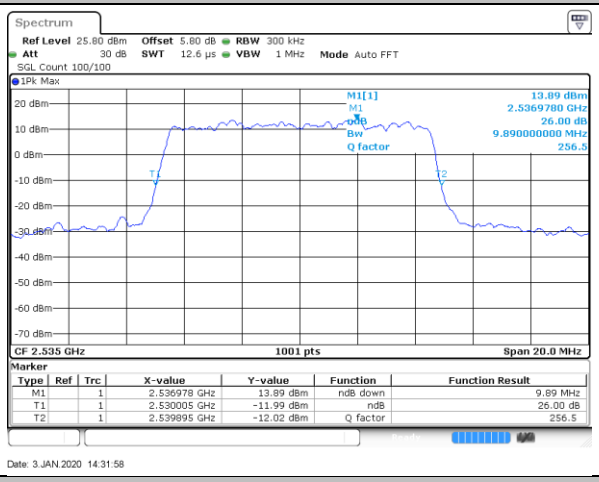
Lowest Channel / 10MHz / QPSK



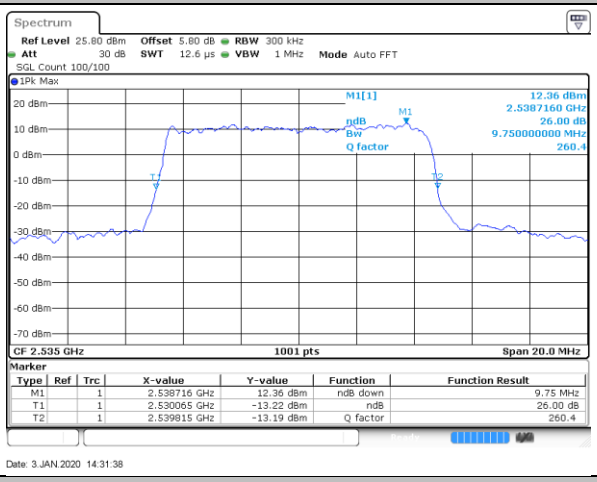
Lowest Channel / 10MHz / 16QAM



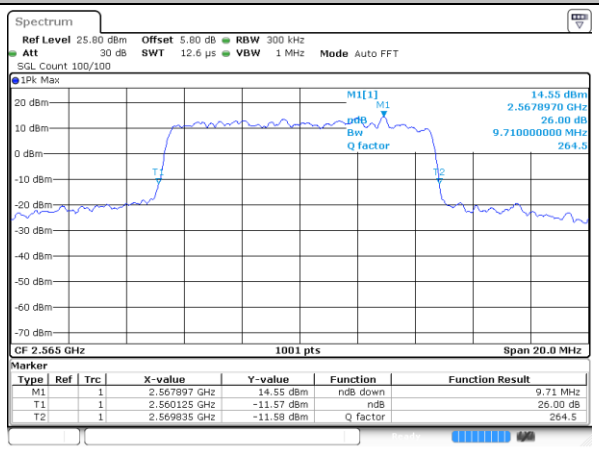
Middle Channel / 10MHz / QPSK



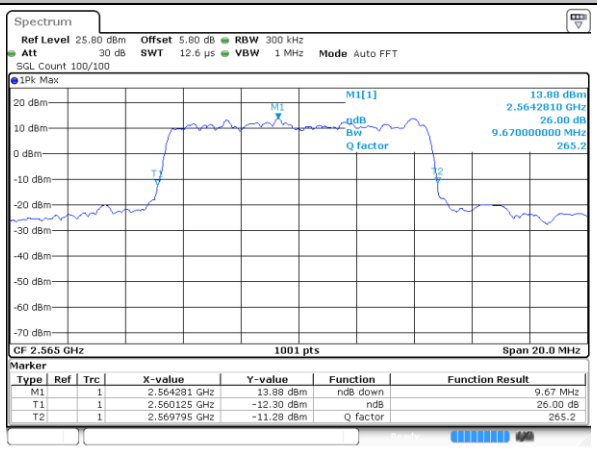
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

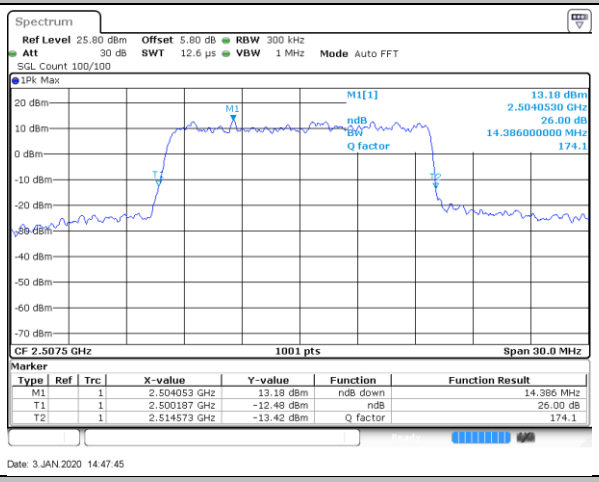


Highest Channel / 10MHz / 16QAM

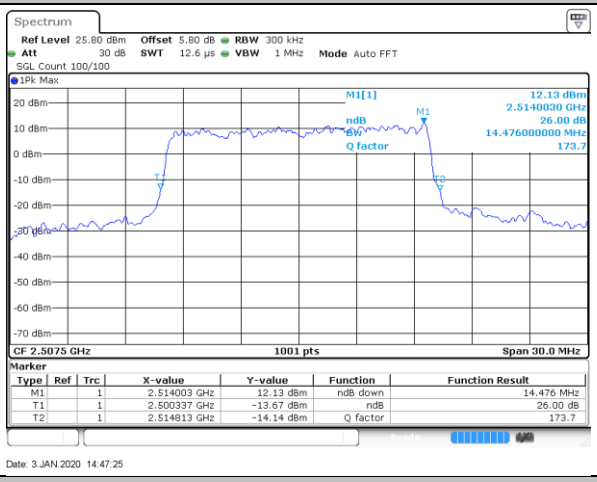


LTE Band 7

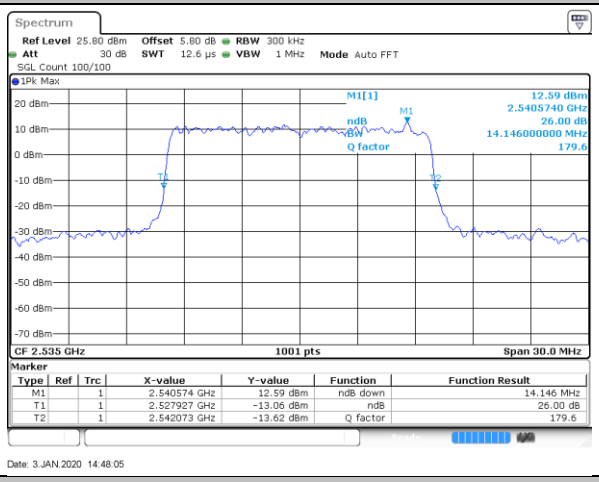
Lowest Channel / 15MHz / QPSK



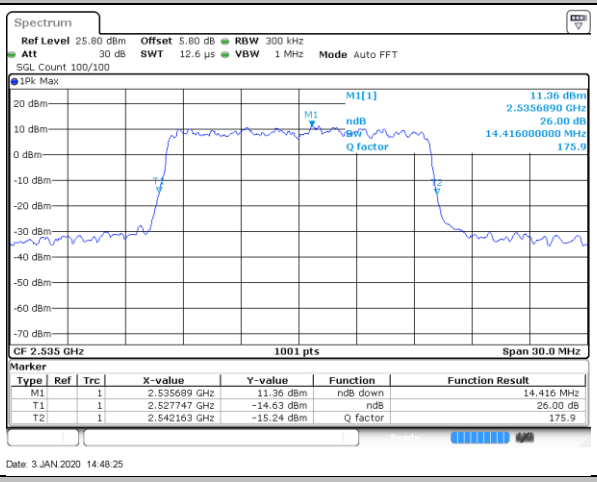
Lowest Channel / 15MHz / 16QAM



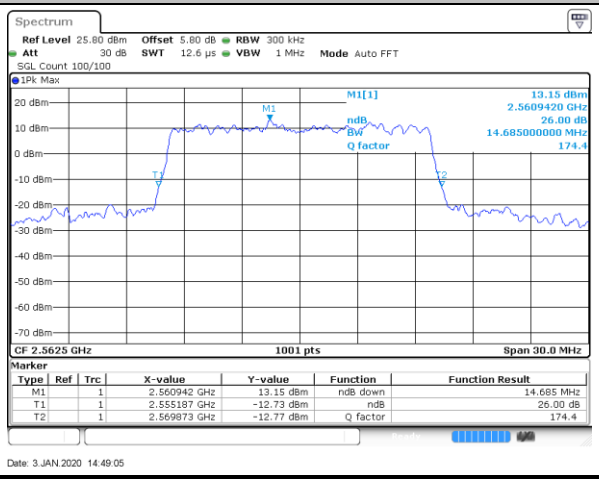
Middle Channel / 15MHz / QPSK



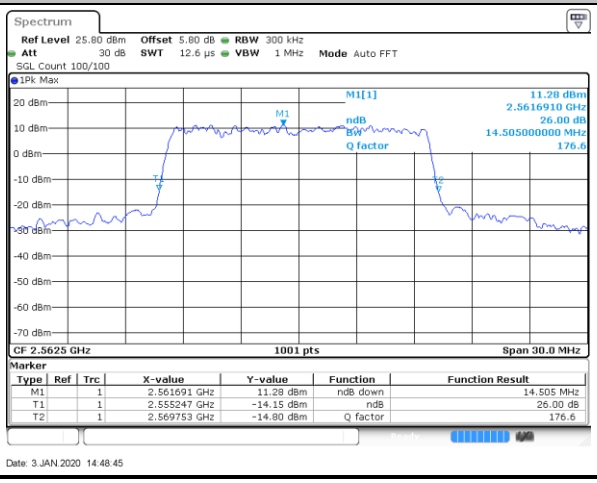
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

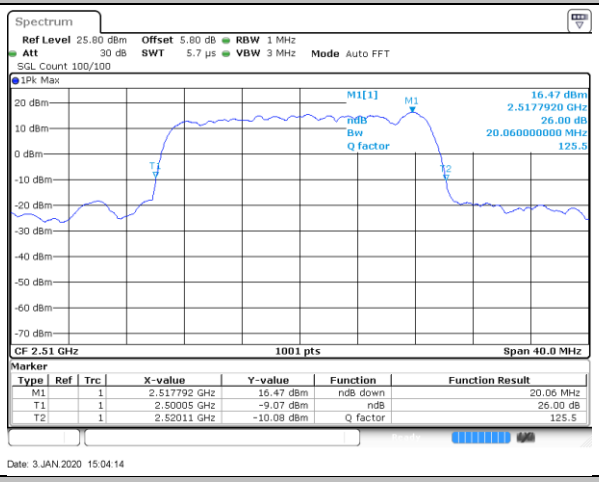


Highest Channel / 15MHz / 16QAM

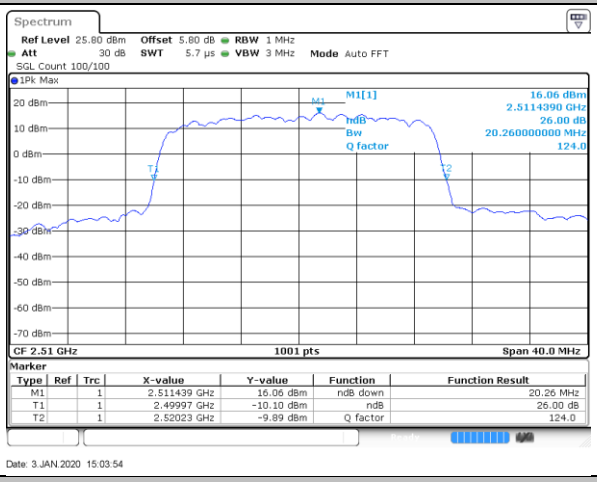


LTE Band 7

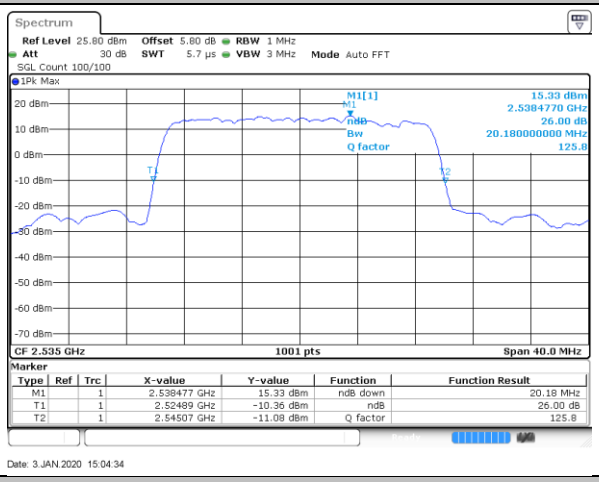
Lowest Channel / 20MHz / QPSK



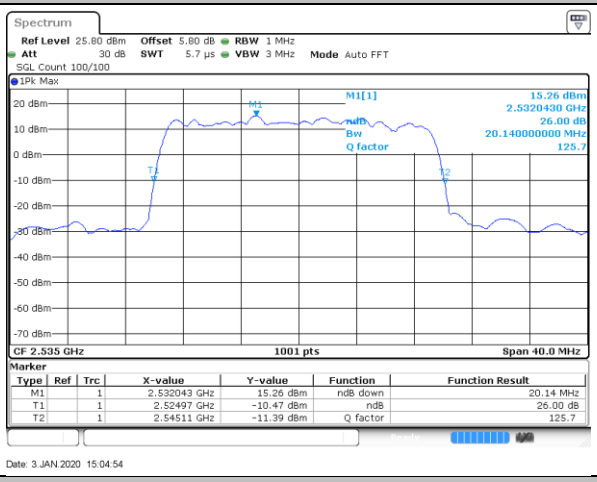
Lowest Channel / 20MHz / 16QAM



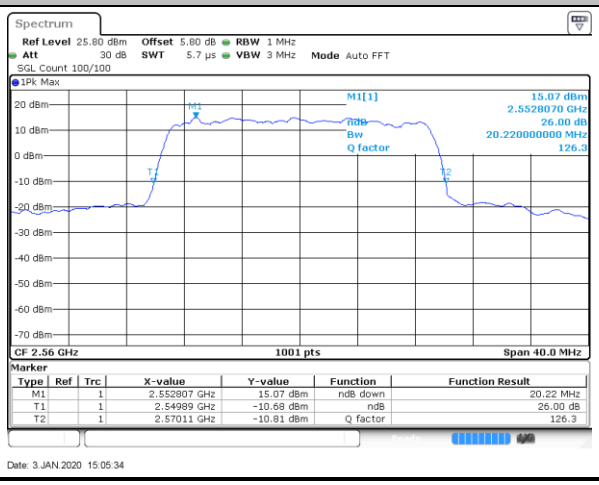
Middle Channel / 20MHz / QPSK



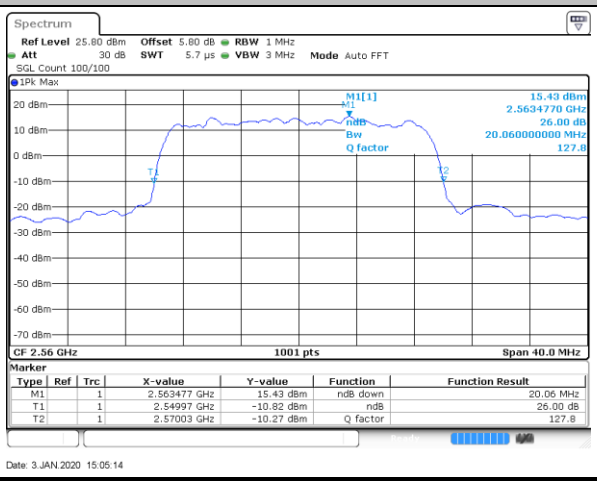
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



Highest Channel / 20MHz / 16QAM

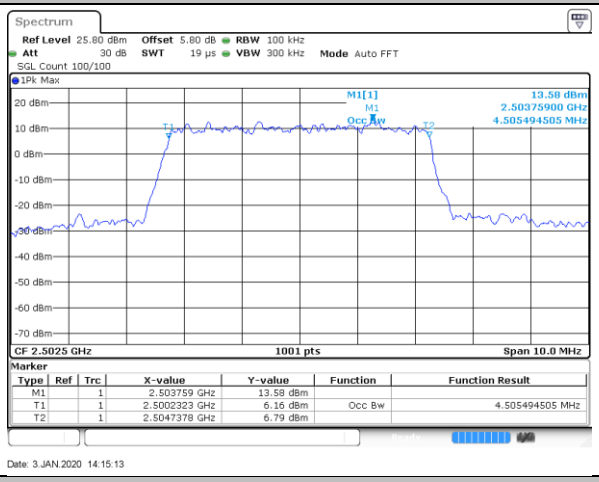


Occupied Bandwidth

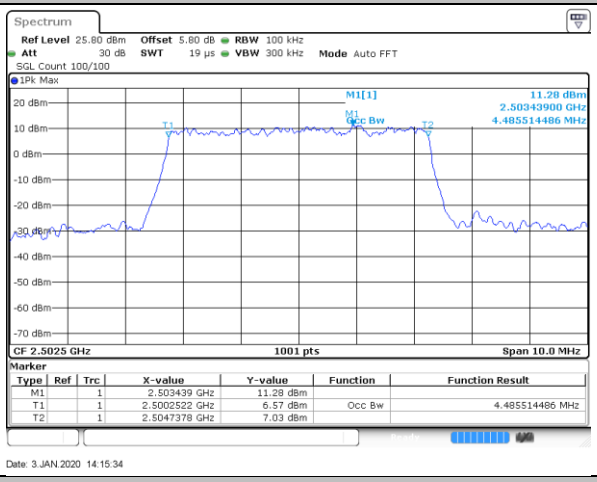
Mode	LTE Band 7 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.51	4.49	8.99	8.95	13.43	13.46	18.26	18.26
Middle CH	-	-	-	-	4.50	4.51	8.97	8.99	13.40	13.34	18.38	18.30
Highest CH	-	-	-	-	4.48	4.52	9.09	8.95	13.43	13.49	18.26	18.26

LTE Band 7

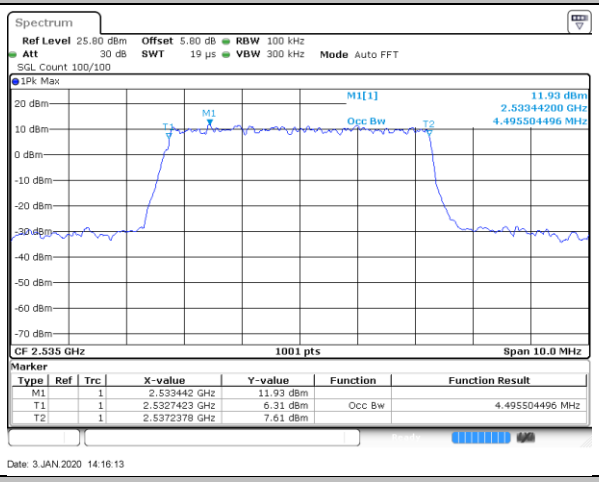
Lowest Channel / 5MHz / QPSK



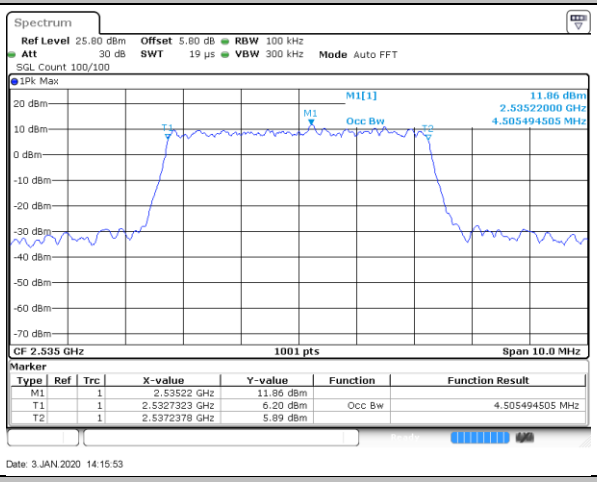
Lowest Channel / 5MHz / 16QAM



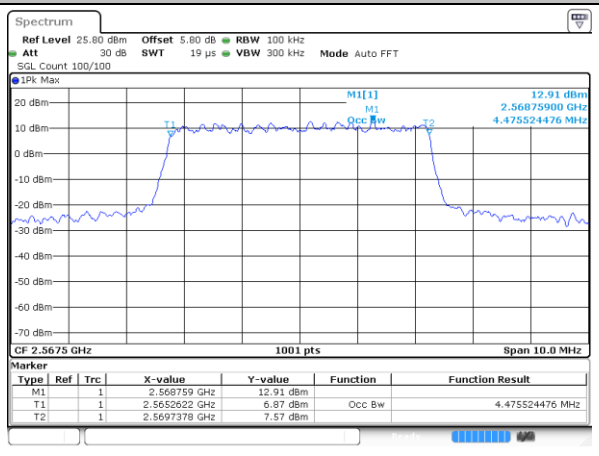
Middle Channel / 5MHz / QPSK



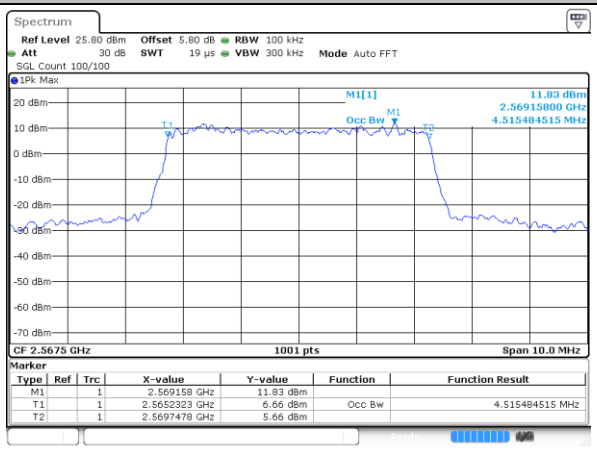
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

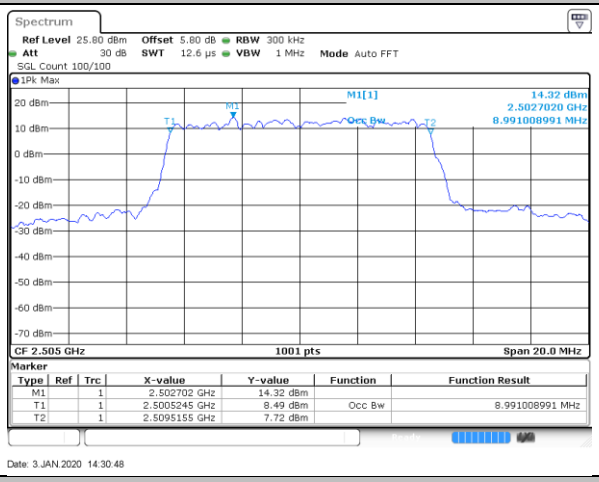


Highest Channel / 5MHz / 16QAM

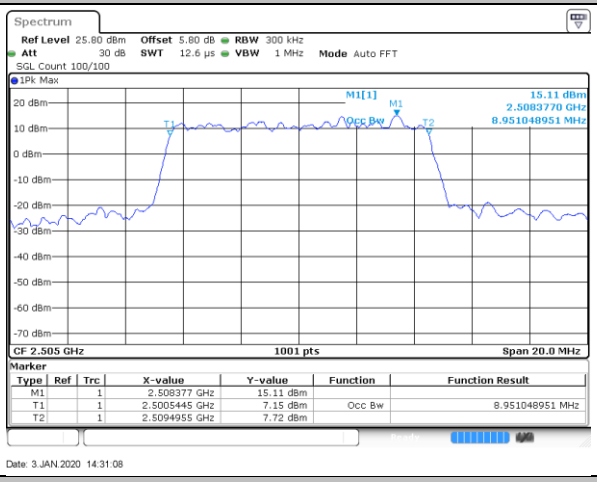


LTE Band 7

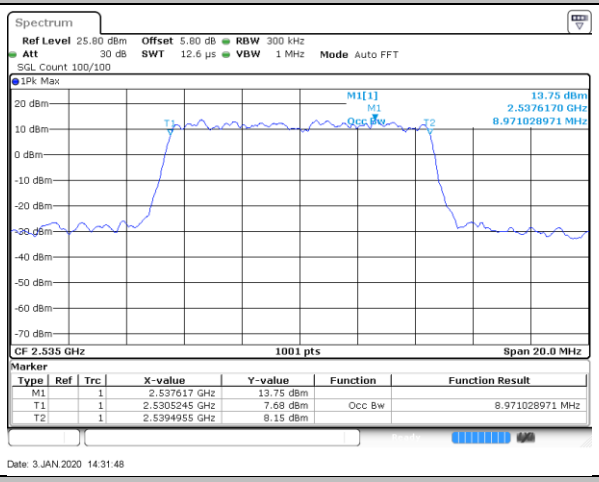
Lowest Channel / 10MHz / QPSK



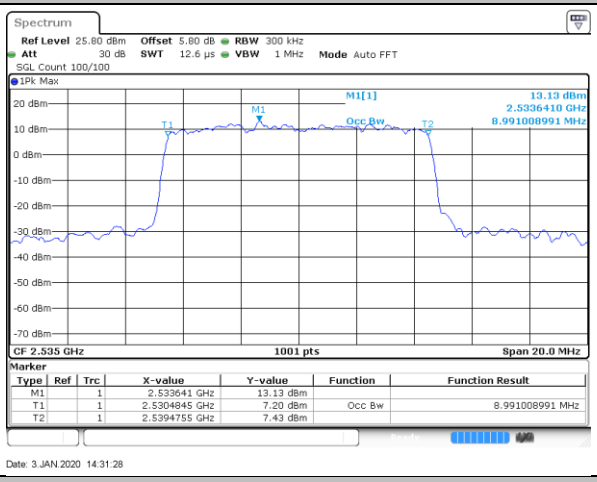
Lowest Channel / 10MHz / 16QAM



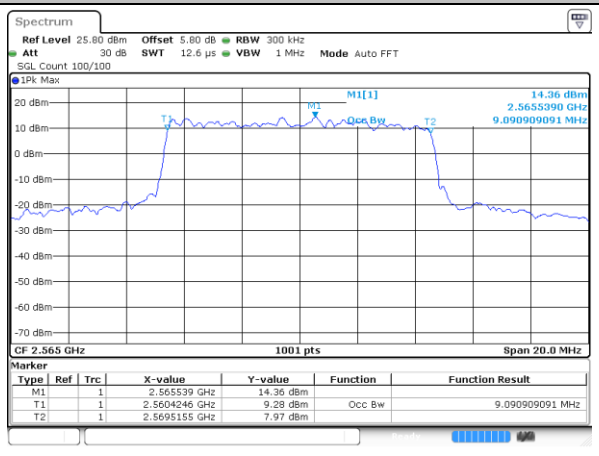
Middle Channel / 10MHz / QPSK



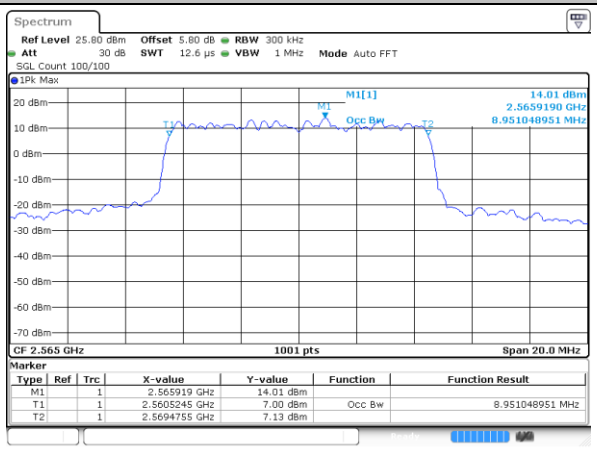
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

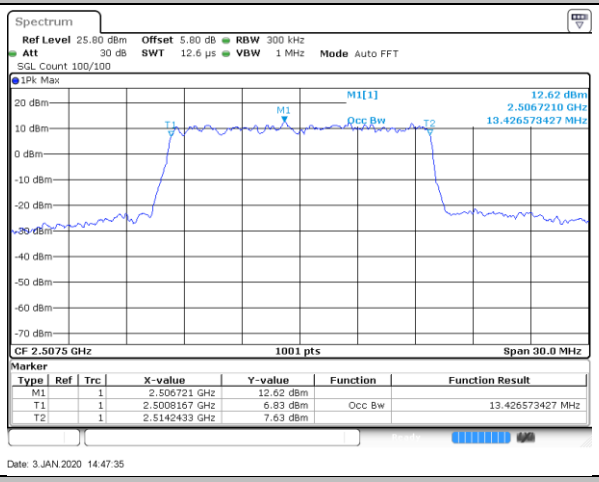


Highest Channel / 10MHz / 16QAM

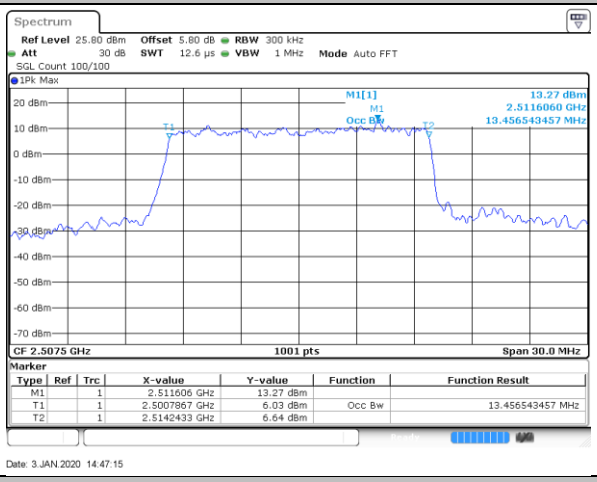


LTE Band 7

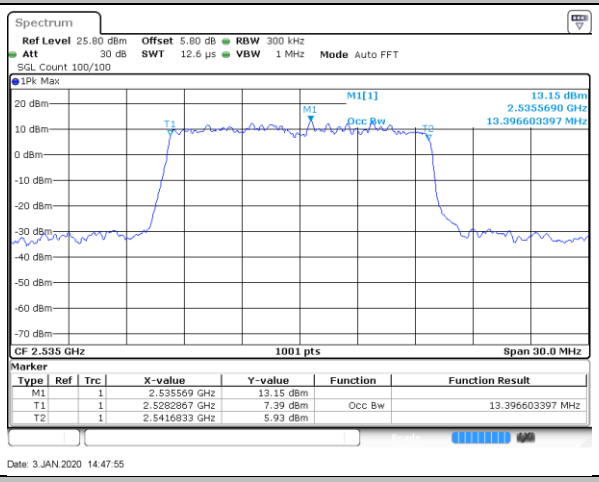
Lowest Channel / 15MHz / QPSK



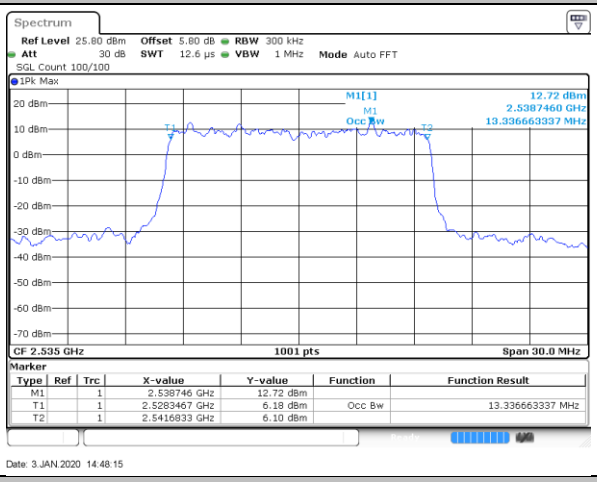
Lowest Channel / 15MHz / 16QAM



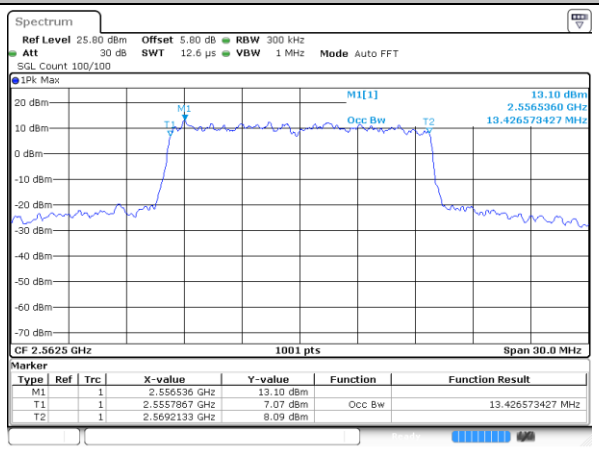
Middle Channel / 15MHz / QPSK



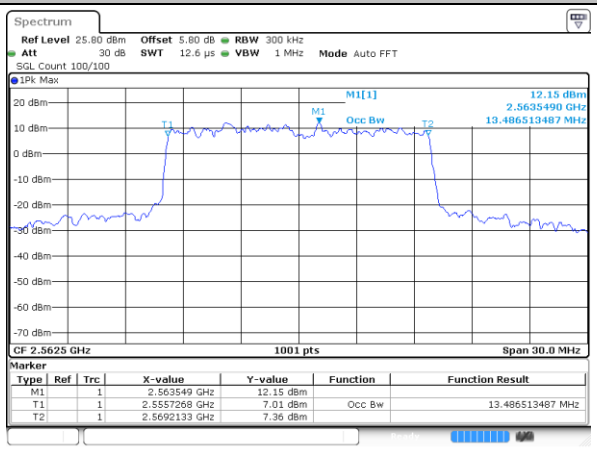
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

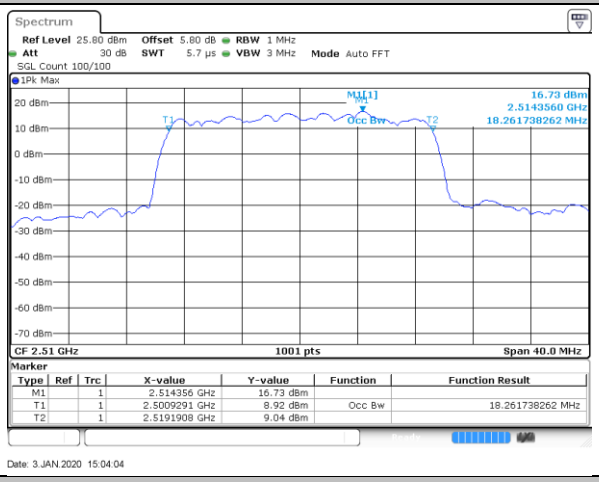


Highest Channel / 15MHz / 16QAM

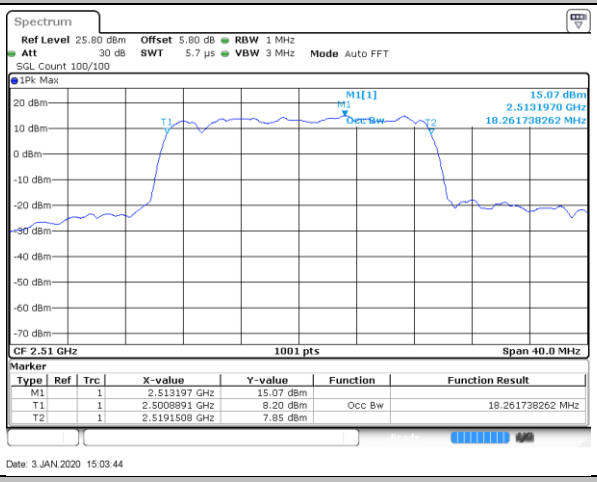


LTE Band 7

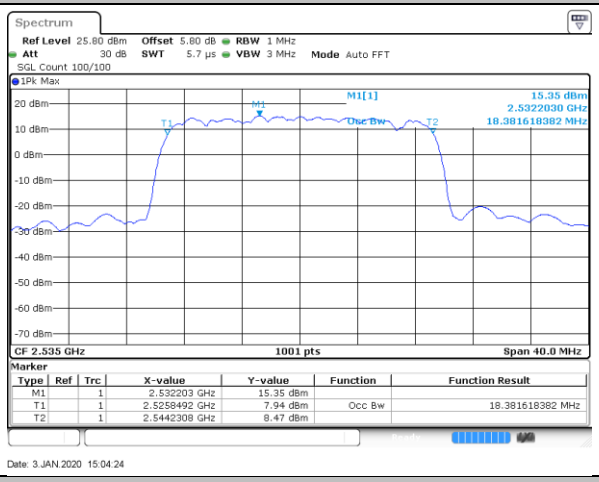
Lowest Channel / 20MHz / QPSK



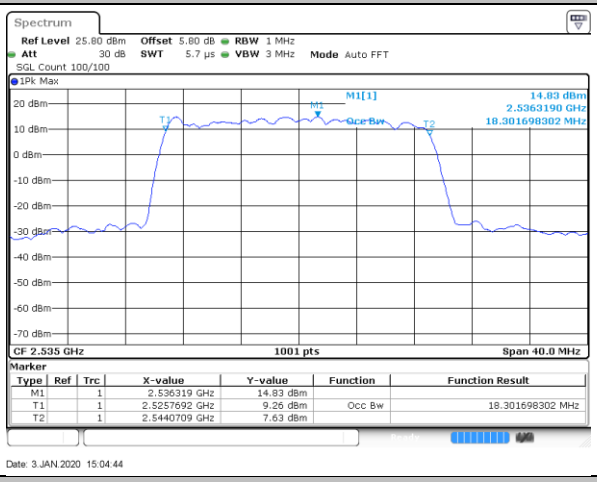
Lowest Channel / 20MHz / 16QAM



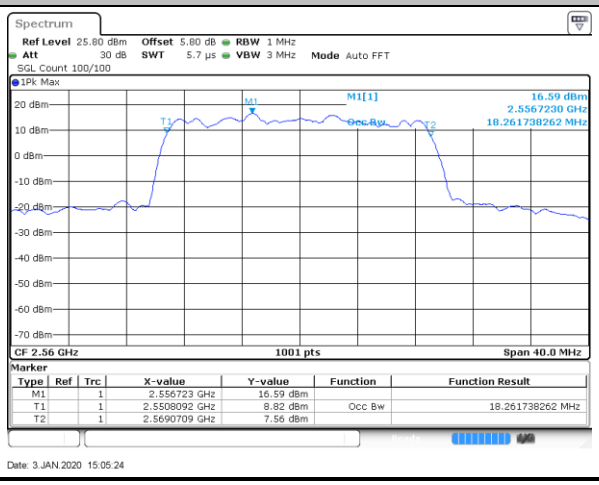
Middle Channel / 20MHz / QPSK



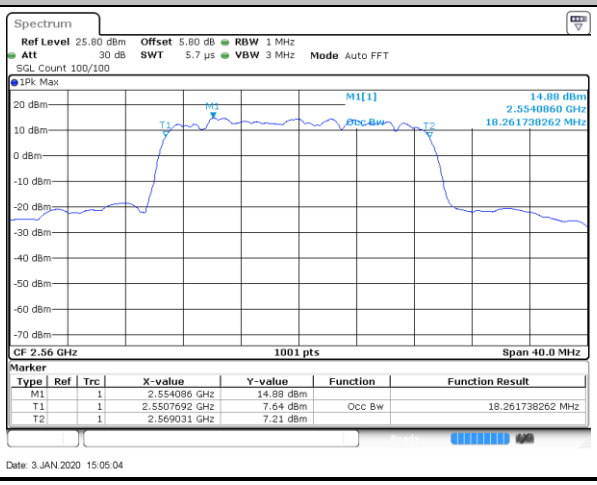
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



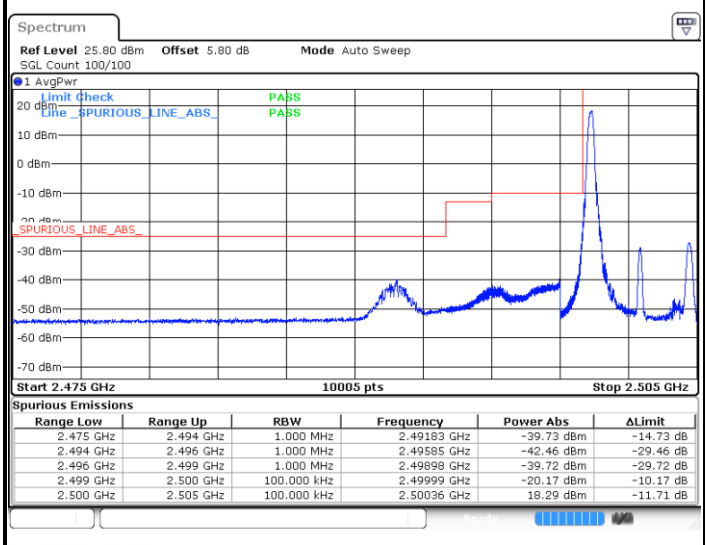
Highest Channel / 20MHz / 16QAM



Conducted Band Edge

LTE Band 7 / 5MHz / QPSK

Lowest Band Edge / 1 RB

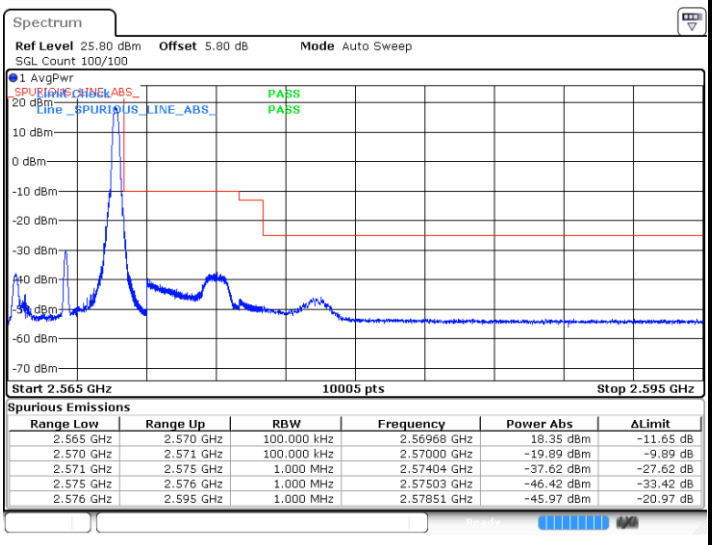


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.494 GHz	1.000 MHz	2.49183 GHz	-39.73 dBm	-14.73 dB
2.494 GHz	2.496 GHz	1.000 MHz	2.49585 GHz	-42.46 dBm	-29.46 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49898 GHz	-39.72 dBm	-29.72 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.49999 GHz	-20.17 dBm	-10.17 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50036 GHz	18.29 dBm	-11.71 dB

Date: 3.JAN.2020 14:18:12

Highest Band Edge / 1 RB

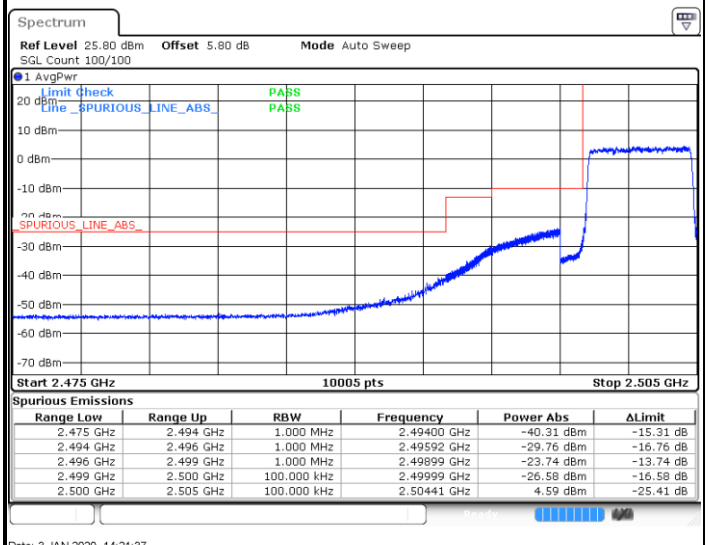


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56968 GHz	18.35 dBm	-11.65 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57000 GHz	-19.89 dBm	-9.89 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57404 GHz	-37.62 dBm	-27.62 dB
2.575 GHz	2.576 GHz	1.000 MHz	2.57503 GHz	-46.42 dBm	-33.42 dB
2.576 GHz	2.595 GHz	1.000 MHz	2.57851 GHz	-45.97 dBm	-20.97 dB

Date: 3.JAN.2020 14:26:10

Lowest Band Edge / Full RB

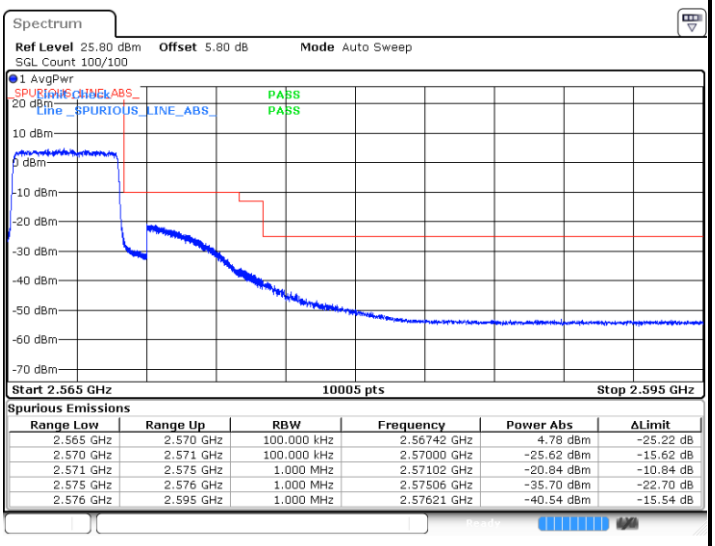


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.494 GHz	1.000 MHz	2.49400 GHz	-40.31 dBm	-15.31 dB
2.494 GHz	2.496 GHz	1.000 MHz	2.49592 GHz	-29.76 dBm	-16.76 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49899 GHz	-23.74 dBm	-13.74 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.49999 GHz	-26.58 dBm	-16.58 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50441 GHz	4.59 dBm	-25.41 dB

Date: 3.JAN.2020 14:21:37

Highest Band Edge / Full RB



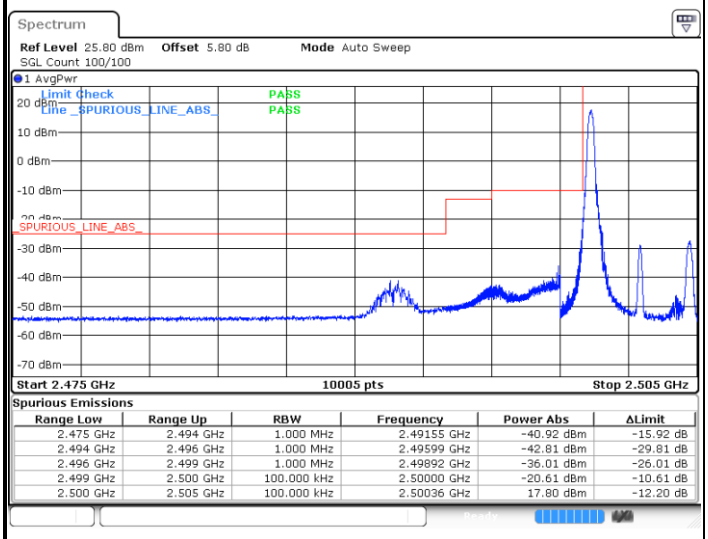
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56742 GHz	4.78 dBm	-25.22 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57000 GHz	-25.62 dBm	-15.62 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57102 GHz	-20.84 dBm	-10.84 dB
2.575 GHz	2.576 GHz	1.000 MHz	2.57506 GHz	-35.70 dBm	-22.70 dB
2.576 GHz	2.595 GHz	1.000 MHz	2.57621 GHz	-40.54 dBm	-15.54 dB

Date: 3.JAN.2020 14:22:45

LTE Band 7 / 5MHz / 16QAM

Lowest Band Edge / 1 RB

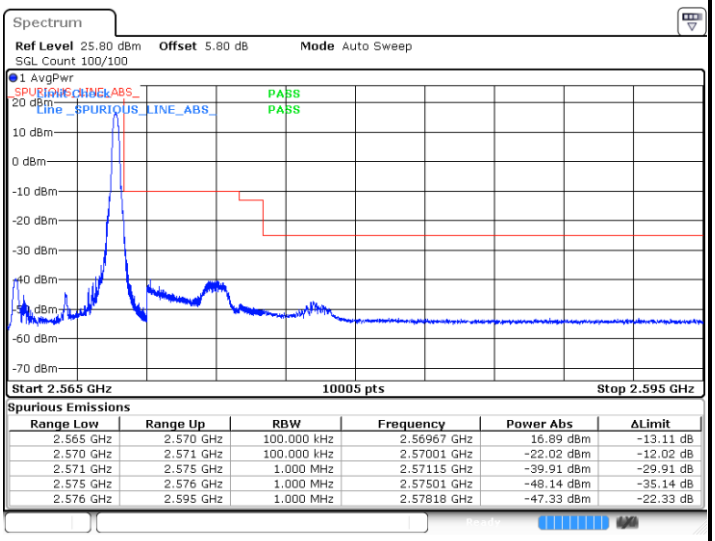


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.494 GHz	1.000 MHz	2.49155 GHz	-40.92 dBm	-15.92 dB
2.494 GHz	2.496 GHz	1.000 MHz	2.49599 GHz	-42.81 dBm	-29.81 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49892 GHz	-36.01 dBm	-26.01 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.50000 GHz	-20.61 dBm	-10.61 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50036 GHz	17.80 dBm	-12.20 dB

Date: 3.JAN.2020 14:19:20

Highest Band Edge / 1 RB

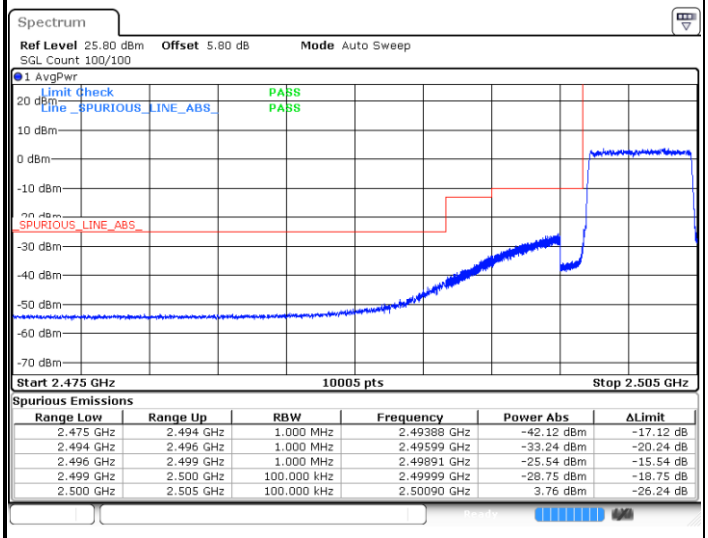


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56967 GHz	16.89 dBm	-13.11 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57001 GHz	-22.02 dBm	-12.02 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57115 GHz	-39.91 dBm	-29.91 dB
2.575 GHz	2.576 GHz	1.000 MHz	2.57501 GHz	-48.14 dBm	-35.14 dB
2.576 GHz	2.595 GHz	1.000 MHz	2.57818 GHz	-47.33 dBm	-22.33 dB

Date: 3.JAN.2020 14:25:01

Lowest Band Edge / Full RB

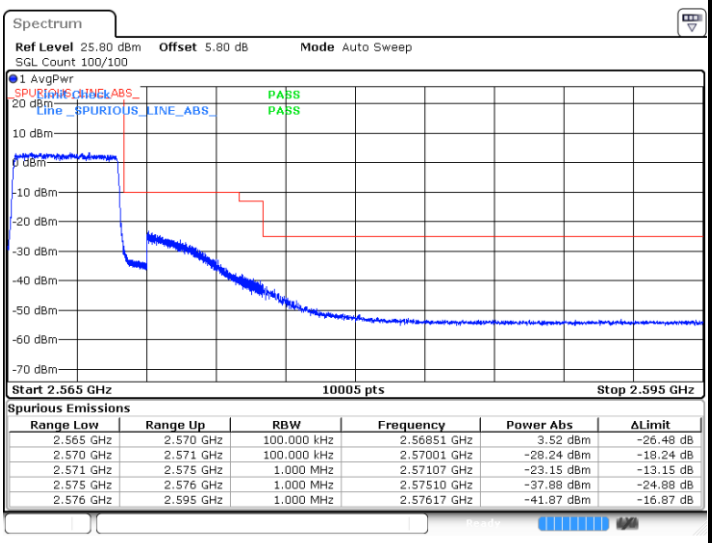


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.494 GHz	1.000 MHz	2.49388 GHz	-42.12 dBm	-17.12 dB
2.494 GHz	2.496 GHz	1.000 MHz	2.49599 GHz	-33.24 dBm	-20.24 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49891 GHz	-25.54 dBm	-15.54 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.49999 GHz	-28.75 dBm	-18.75 dB
2.500 GHz	2.505 GHz	100.000 kHz	2.50090 GHz	3.76 dBm	-26.24 dB

Date: 3.JAN.2020 14:20:29

Highest Band Edge / Full RB



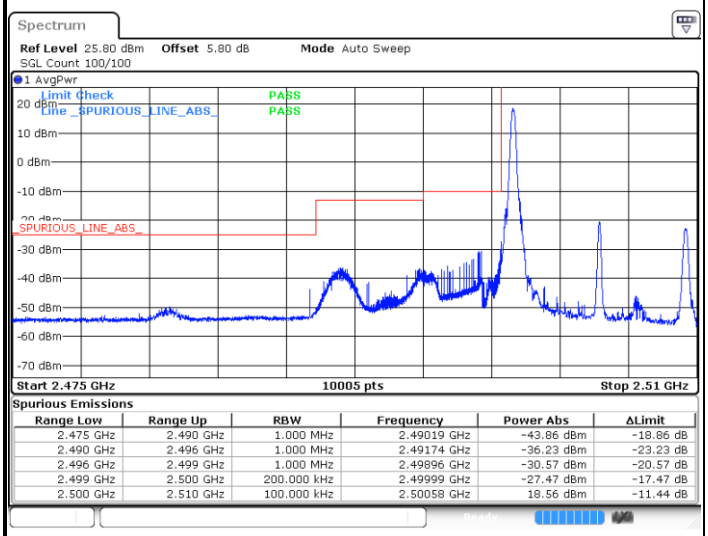
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.565 GHz	2.570 GHz	100.000 kHz	2.56851 GHz	3.52 dBm	-26.48 dB
2.570 GHz	2.571 GHz	100.000 kHz	2.57001 GHz	-28.24 dBm	-18.24 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57107 GHz	-23.15 dBm	-13.15 dB
2.575 GHz	2.576 GHz	1.000 MHz	2.57510 GHz	-37.88 dBm	-24.88 dB
2.576 GHz	2.595 GHz	1.000 MHz	2.57617 GHz	-41.87 dBm	-16.87 dB

Date: 3.JAN.2020 14:23:53

LTE Band 7 / 10MHz / QPSK

Lowest Band Edge / 1 RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.49019 GHz	-43.86 dBm	-18.86 dB
2.490 GHz	2.496 GHz	1.000 MHz	2.49174 GHz	-36.23 dBm	-23.23 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49896 GHz	-30.57 dBm	-20.57 dB
2.499 GHz	2.500 GHz	200.000 kHz	2.49999 GHz	-27.47 dBm	-17.47 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50058 GHz	18.56 dBm	-11.44 dB

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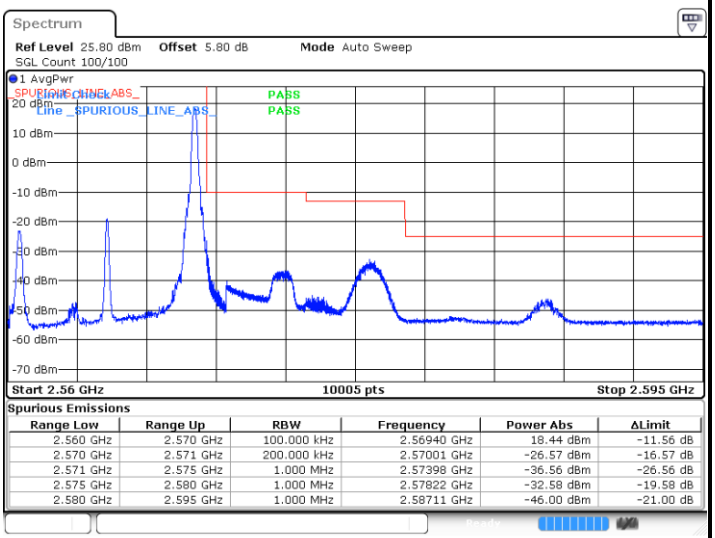
Highest Band Edge / 1 RB

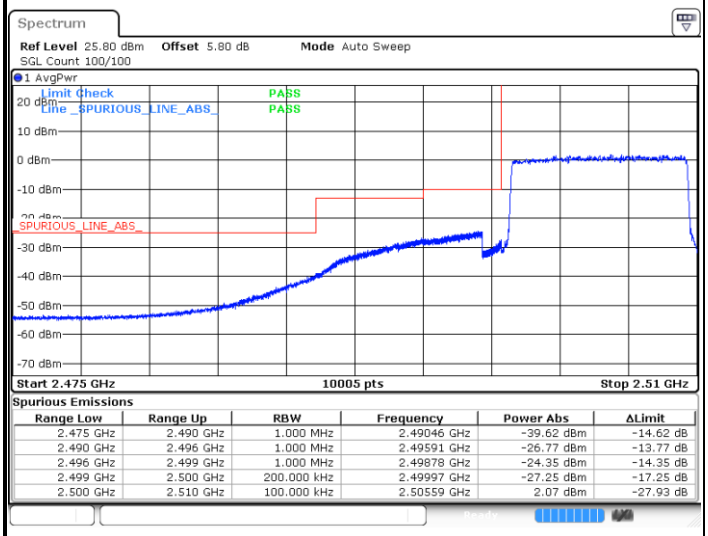


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.560 GHz	2.570 GHz	100.000 kHz	2.56940 GHz	18.44 dBm	-11.56 dB
2.570 GHz	2.571 GHz	200.000 kHz	2.57001 GHz	-26.57 dBm	-16.57 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57398 GHz	-36.56 dBm	-26.56 dB
2.575 GHz	2.580 GHz	1.000 MHz	2.57822 GHz	-32.58 dBm	-19.58 dB
2.580 GHz	2.595 GHz	1.000 MHz	2.58711 GHz	-46.00 dBm	-21.00 dB

Date: 3.JAN.2020 14:41:43

Lowest Band Edge / Full RB

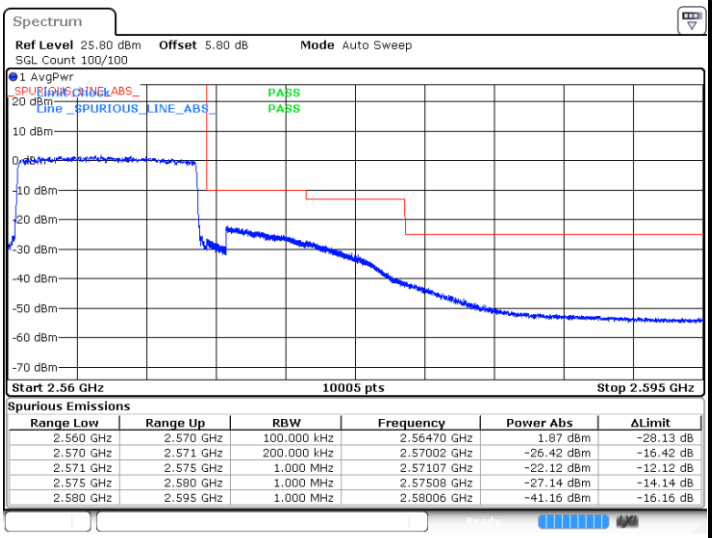


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.475 GHz	2.490 GHz	1.000 MHz	2.49046 GHz	-39.62 dBm	-14.62 dB
2.490 GHz	2.496 GHz	1.000 MHz	2.49591 GHz	-26.77 dBm	-13.77 dB
2.496 GHz	2.499 GHz	1.000 MHz	2.49878 GHz	-24.35 dBm	-14.35 dB
2.499 GHz	2.500 GHz	200.000 kHz	2.49997 GHz	-27.25 dBm	-17.25 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50559 GHz	2.07 dBm	-27.93 dB

Date: 3.JAN.2020 14:37:11

Highest Band Edge / Full RB



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.560 GHz	2.570 GHz	100.000 kHz	2.56470 GHz	1.87 dBm	-28.13 dB
2.570 GHz	2.571 GHz	200.000 kHz	2.57002 GHz	-26.42 dBm	-16.42 dB
2.571 GHz	2.575 GHz	1.000 MHz	2.57107 GHz	-22.12 dBm	-12.12 dB
2.575 GHz	2.580 GHz	1.000 MHz	2.57508 GHz	-27.14 dBm	-14.14 dB
2.580 GHz	2.595 GHz	1.000 MHz	2.58006 GHz	-41.16 dBm	-16.16 dB

Date: 3.JAN.2020 14:38:19