MOTOROLA SOLUTIONS

CERTIFICATE 2518.08

SAMM 825

MOTOROLA PENANG ADV. COMM. LABORATORY
Motorola Solutions Malaysia Sdn Bhd,
Plot 2A, Medan Bayan Lepas,
Mukim 12 S.W.D, 11900 Bayan Lepas,
Penang, Malaysia.

FCC / ISED TEST REPORT

Report Revision : Rev.B

Date/s Tested	:	04-April-2024 - 28-June-2024
Report Issue Date	:	19-August-2024
Manufacturer/Location	:	Motorola Solutions Malaysia Sdn Bhd
Manufacturer Address	:	Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia
Requestor	:	CADOGAN SEAN
Product Type	:	Hand-held
Product Marketing Name (PMN)	:	APX N70
Hardware Version Identification Number (HVIN)	:	H35KET9PW8AN & H35KET9PW8AN-H
Frequency Band	:	Refer to section 1.4
Rated / Max RF Output Power	:	199.53mW / 252mW
Applicant Name	:	Motorola Solutions Inc
Applicant Address	:	Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia
FCC Registrations	:	461337
ISED Registrations	:	MY0001
Firmware Version Identification Number (FVIN)	:	D03.75.21 (BP), D00.00.16 (AP)

The equipment was tested accordance to the requirement listed below:

(LTE Band 2) **FCC 47 CFR Part 2 / 24** **ISED RSS GEN / 133**	**PASS**

Prepared By:

Awatif Rahman
Technician

Approve Signatory:

Maheshvaran A/L Rajagopal
Responsible Engineer

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REVISION HISTORY

Revision History	Description	Date	Originator
Rev. A	Initial Report	09-July-2024	Awatif Rahman
Rev B.	Update Firmware Version Identification Number (FVIN)	19-August-2024	Awatif Rahman

1.0. Summary of Test Results

FCC Clause	ISED Clause	Test Item	Results	Remarks	Serial Number Tested
2.1046 24.232(e)	RSS-Gen 6.12 RSS-133 4.1	Conducted RF Output Power	Pass	Meet the requirement of limit	022TAD0679
24.232(d)	RSS-133 6.4	Peak-to-Average Power Ratio	Pass	Meet the requirement of limit	022TAD0679
2.1049 24.238(b)	RSS-Gen 6.6 RSS-133 2.3	Occupied Bandwidth (20dBc, 26dBc, and 99%)	Pass	Meet the requirement of limit	022TAD0679
2.1055 24.235	RSS-Gen 6.11 RSS-133 6.3	Frequency Stability	Pass	Meet the requirement of limit	022TAD0679
2.1051 24.238(a)(b)	RSS-Gen 6.13 RSS-133 6.5	Band Edge Conducted Spurious Emission	Pass	Meet the requirement of limit	022TAD0679
2.1051 24.238(a)(b)	RSS-Gen 6.13 RSS-133 6.5	Conducted Spurious Emissions	Pass	Meet the requirement of limit	022TAD0679
2.1053 24.236, 24.238	RSS-133 6.5	Radiated Spurious Emission	Pass	-28.9583dBm (Margin: 15.9583dBm, Noise Floor)	022TAF1521
24.232 (c)	RSS-133 6.4	Equivalent Isotropically Radiated Power (EIRP)	Pass	Meet the requirement of limit	022TAD0679

1.1. Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±dB)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01
	200MHz ~ 1000MHz	5.01
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01
	18GHz ~ 25GHz	5.01

1.2. Equipment List

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
BROADBAND ATE 1 (RF CONDUCTED TESTS)				
Wideband Radio Communication Tester	CMW500	154550	08-Aug-23	08-Aug-24
Signal Analyzer	FSV40	101431	07-Aug-23	07-Aug-24
Chamber	SH-641	92003150	15-Sep-23	15-Sep-24
Power Supply	6652A	3640A02967	15-Oct-23	15-Oct-24
Test Software	R&S CMWrun			
Version	V.1.9.8			
RADIATED SPURIOUS EMISSION (EMC CHAMBER 1)				
DRG HORN FREQ.	SAS-571	1143	08-Mar-23	08-Mar-25
DRG HORN FREQ.	SAS-571	720	18-Apr-23	18-Apr-25
DC Power Supply	NR973A	MY54180189	30-Aug-23	30-Aug-24
SIGNAL GENERATOR	SMB 100A	182511	4-Jun-21	4-Jun-24
EMI TEST RECEIVER	ESW44	101731	11-Aug-23	11-Aug-24
5m SEMI-ANECHOIC CHAMBER	S800-HX	J2308	Not Required	Not Required
BILOG ANTENNA	CBL6112B	2950	14-Dec-23	14-Dec-24
BILOG ANTENNA	CBL6112B	2964	25-Sep-23	25-Sep-24
DATA LOGGER THERMOHYGROMETER	SDL500	A.016800	21-Jun-23	21-Jun-24
SYSTEM CONTROLLER	SC104V	050806-1	Not Required	Not Required
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	Not Required	Not Required
ANTENNA POSITIONING TOWER	TLT2	NA	Not Required	Not Required
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170143	28-Aug-2023	28-Aug-2024
PREAMPLIFIER 18-40GHz	Miteq Hi Gain Sucoflex	002	Not Required	Not Required
PREAMPLIFIER	PAM-0118P	269	28-Jun-23	28-Jun-24
LOOP ANTENNA	6502	00208416	26-Oct-23	26-Oct-24
Test Software	EMC_FCC_IC_BLUETOOTH_RE_TEST			
Version	EMC_FCC_RE_v1.6.5			

1.3. General Information

General Description of EUT

Product	APX N70			
Brand	Motorola Solutions			
Test Model	H35KET9PW8AN & H35KET9PW8AN-H			
Power Supply Rating	7.5 Vdc			
Mode of Operation	LTE Band 2			
Modulation Type	QPSK, 16QAM			
Operating Frequency	LTE Band 2	Channel Bandwidth 1.4MHz	1850.7MHz~1909.3MHz	
		Channel Bandwidth 3MHz	1851.5MHz~1908.5MHz	
		Channel Bandwidth 5MHz	1852.5MHz~1907.5MHz	
		Channel Bandwidth 10MHz	1855.0MHz~1905.0MHz	
		Channel Bandwidth 15MHz	1857.5MHz~1902.5MHz	
		Channel Bandwidth 20MHz	1860.0MHz~1900.0MHz	
Max. Conducted RF Output Power	LTE Band 2 QPSK	Channel Bandwidth 1.4MHz	23.399dBm (0.219W)	
		Channel Bandwidth 3MHz	23.342dBm (0.216W)	
		Channel Bandwidth 5MHz	23.323dBm (0.215W)	
		Channel Bandwidth 10MHz	23.384dBm (0.218W)	
		Channel Bandwidth 15MHz	**23.414dBm (0.219W)**	
		Channel Bandwidth 20MHz	23.225dBm (0.210W)	
	LTE Band 2 16QAM	Channel Bandwidth 1.4MHz	22.447dBm (0.176W)	
		Channel Bandwidth 3MHz	22.454dBm (0.176W)	
		Channel Bandwidth 5MHz	22.500dBm (0.178W)	
		Channel Bandwidth 10MHz	22.479dBm (0.177W)	
		Channel Bandwidth 15MHz	22.608dBm (0.182W)	
		Channel Bandwidth 20MHz	**22.785dBm (0.19W)**	
Emission Designator	LTE Band 2		**QPSK**	**16QAM**
		Channel Bandwidth 1.4MHz	1M07G7D	1M07D7W
		Channel Bandwidth 3MHz	2M68G7D	2M67D7W
		Channel Bandwidth 5MHz	4M47G7D	4M48D7W
		Channel Bandwidth 10MHz	8M93G7D	8M93D7W
		Channel Bandwidth 15MHz	13M40G7D	13M40D7W
		Channel Bandwidth 20MHz	17M90G7D	17M90D7W
Antenna Type	LTE Band 2	Stamped Metal, Antenna LTE Main 1850-1910MHz (1.1dBi)		
SW Version	D03.75.21 (BP), D00.0016 (AP)			
HW Version	P1			

Note:

1. The EUT contains following accessory devices and data cable.

Item	Brand	Model or P/N	Specification
Li-Ion Battery	MOTOROLA	PMNN4818A	UL 3650mAH (using RN 2170 Li-Ion cell)

Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	Product	Brand	Model No.	Serial No.	FCC ID
1	Wideband Radio Communication Tester	R&S	CMW500	154550	NA

NO.	Signal Cable Description of The above Support Units
1	NA

Note:

1. All power cords of the above support units are non-shielded.
2. Item 1 acted as a communication partner to transfer data.

EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2
FCC 47 CFR Part 24
KDB 971168 D01 Power Meas License Digital Systems v03r01
KDB 971168 D02 Misc OOBE License Digital Systems v02r01
ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

1.4. Channel Number and Frequency Info

Band	Bandwidth Supported	Available Channel Number	Test Channel Number			Test Channel Frequency (MHz)		
			Low Channel	Mid Channel	High Channel	Low Channel	Mid Channel	High Channel
LTE Band 2	1.4 MHz	18607 ~ 19193	18607	18900	19193	1850.7	1880.0	1909.3
	3 MHz	18615 ~ 19185	18615	18900	19185	1851.5	1880.0	1908.5
	5 MHz	18625 ~ 19175	18625	18900	19175	1852.5	1880.0	1907.5
	10 MHz	18650 ~ 19150	18650	18900	19150	1855.0	1880.0	1905.0
	15 MHz	18675 ~ 19125	18675	18900	19125	1857.5	1880.0	1902.5
	20 MHz	18700 ~ 19100	18700	18900	19100	1860.0	1880.0	1900.0

1.5. Test Mode Applicability and Tested Channel Detail

Pre-scan also have been conducted with the accessory devices listed in section table 1.3, only the worst case radiated emission results of the combination test configuration is reported in this report.
The following channel(s) was (were) selected for the final test as listed below:

LTE Band 2

Test Item	Available Channel	Tested Channel	Channel Bandwidth	Uplink Modulation	Mode
Conducted RF Output Power	18607 ~ 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	As per table 1.6.3
	18615 ~ 19185	18615, 18900, 19185	3 MHz		
	18625 ~ 19175	18625, 18900, 19175	5 MHz		
	18650 ~ 19150	18650, 18900, 19150	10 MHz		
	18675 ~ 19125	18675, 18900, 19125	15 MHz		
	18700 ~ 19100	18700, 18900, 19100	20 MHz		
Peak to Average Power Ratio	18607 ~ 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
	18615 ~ 19185	18615, 18900, 19185	3 MHz		15 RB / 0 RB Offset
	18625 ~ 19175	18625, 18900, 19175	5 MHz		25 RB / 0 RB Offset
	18650 ~ 19150	18650, 18900, 19150	10 MHz		50 RB / 0 RB Offset
	18675 ~ 19125	18675, 18900, 19125	15 MHz		75 RB / 0 RB Offset
	18700 ~ 19100	18700, 18900, 19100	20 MHz		100 RB / 0 RB Offset
Occupied Bandwidth	18607 ~ 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	6 RB / 0 RB Offset
	18615 ~ 19185	18615, 18900, 19185	3 MHz		15 RB / 0 RB Offset
	18625 ~ 19175	18625, 18900, 19175	5 MHz		25 RB / 0 RB Offset
	18650 ~ 19150	18650, 18900, 19150	10 MHz		50 RB / 0 RB Offset
	18675 ~ 19125	18675, 18900, 19125	15 MHz		75 RB / 0 RB Offset
	18700 ~ 19100	18700, 18900, 19100	20 MHz		100 RB / 0 RB Offset
Frequency Stability	18607 ~ 19193	18607, 19193	1.4 MHz	QPSK	6 RB / 0 RB Offset
	18615 ~ 19185	18615, 19185	3 MHz		15 RB / 0 RB Offset
	18625 ~ 19175	18625, 19175	5 MHz		25 RB / 0 RB Offset
	18650 ~ 19150	18650, 19150	10 MHz		50 RB / 0 RB Offset
	18675 ~ 19125	18675, 19125	15 MHz		75 RB / 0 RB Offset

	18700 ~ 19100	18700, 19100	20 MHz		100 RB / 0 RB Offset
Band Edge Conducted Spurious Emission	18607 ~ 19193	18607, 19193	1.4 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
	18615 ~ 19185	18615, 19185	3 MHz		1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
	18625 ~ 19175	18625, 19175	5 MHz		1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
	18650 ~ 19150	18650, 19150	10 MHz		1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
	18675 ~ 19125	18675, 19125	15 MHz		1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
	18700 ~ 19100	18700, 19100	20 MHz		1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
Conducted Spurious Emission	18607 ~ 19193	18607, 18900, 19193	1.4 MHz	QPSK	1 RB / 5 RB Offset
	18615 ~ 19185	18615, 18900, 19185	3 MHz		1 RB / 0 RB Offset
	18625 ~ 19175	18625, 18900, 19175	5 MHz		1 RB / 0 RB Offset
	18650 ~ 19150	18650, 18900, 19150	10 MHz		1 RB / 0 RB Offset
	18675 ~ 19125	18675, 18900, 19125	15 MHz		1 RB / 0 RB Offset
	18700 ~ 19100	18700, 18900, 19100	20 MHz		1 RB / 49 RB Offset
Radiated Spurious Emission	18650 ~ 19150	18650	10 MHz	QPSK	1 RB / 0 RB Offset
	18700 ~ 19100	18900	20 MHz		1 RB / 99 RB Offset
	18675 ~ 19125	19125	15 MHz		1 RB / 0 RB Offset
Equivalent Isotropically Radiated Power (EIRP)	18607 ~ 19193	18607, 18900, 19193	1.4 MHz	QPSK, 16QAM	As per table 1.6.4
	18615 ~ 19185	18615, 18900, 19185	3 MHz		
	18625 ~ 19175	18625, 18900, 19175	5 MHz		
	18650 ~ 19150	18650, 18900, 19150	10 MHz		
	18675 ~ 19125	18675, 18900, 19125	15 MHz		
	18700 ~ 19100	18700, 18900, 19100	20 MHz		

NOTE:

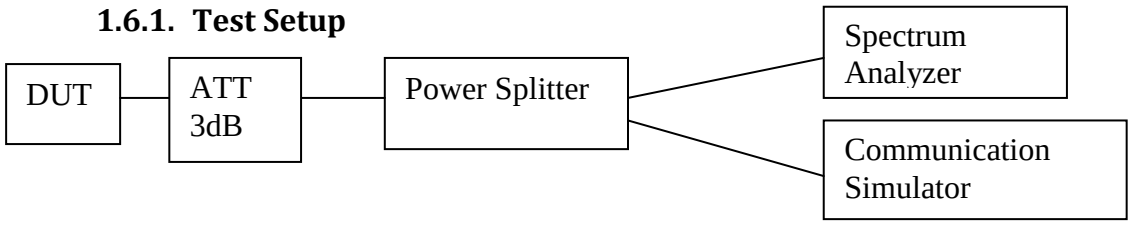
1. The Conducted RF Output Power for QPSK and 16QAM, measured value of QPSK mode is higher than 16QAM mode. Therefore, only Conducted Spurious Emission and Radiated Emission had been tested under QPSK modes.
2. Band Edge was performed with 1 and full Resource Block at the lowest and highest operating frequency band.
3. The Equivalent Isotropically Radiated Power (EIRP) was calculated from Conducted RF Output Power results in QPSK and 16QAM modulation.
4. Peak to Average and Occupied Bandwidth were performed with full Resource Block which is the worst case.
5. Frequency stability was performed with full Resource Block in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Conducted RF Output Power	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Peak-to-Average Power Ratio	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Occupied Bandwidth	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Frequency Stability	-30ºC ~ 60ºC	7.5 Vdc	Awatif Rahman
Band Edge Conducted Spurious Emission	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Conducted Spurious Emission	25ºC, 50% RH	7.5 Vdc	Awatif Rahman
Radiated Spurious Emission	23.4ºC, 69.3% RH	7.5 Vdc	Rezza & Fuad
Equivalent Isotropically Radiated Power (EIRP)	25ºC, 50% RH	7.5 Vdc	Awatif Rahman

1.6. Conducted RF Output Power

1.6.1. Test Setup



1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. All the measurement was done at low, mid, high channel for each band and different modulation.
5. Record the average power into the test report.

1.6.2. Test Limits

FCC: Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.
ISED: Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

1.6.3. Conducted RF Output Power – LTE Band 2 (1850-1910MHz)

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18607	18900	19193	18607	18900	19193
			1850.7 MHz	1880.0 MHz	1909.3 MHz	1850.7 MHz	1880.0 MHz	1909.3 MHz
Band 2 / 1.4 MHz	1	0	23.168	23.108	23.368	22.235	22.118	22.213
	1	3	23.219	23.101	23.394	22.279	22.142	22.214
	1	5	23.186	23.043	**23.399**	22.205	22.044	22.191
	3	0	23.159	23.075	23.233	22.116	22.059	22.37
	3	2	23.171	23.077	23.306	22.152	22.055	**22.447**
	3	3	23.129	22.973	23.268	22.11	22.022	22.378
	6	0	22.102	22.023	22.188	21.088	20.986	21.285

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18615	18900	19185	18615	18900	19185
			1851.5 MHz	1880.0 MHz	1908.5 MHz	1851.5 MHz	1880.0 MHz	1908.5 MHz
Band 2 / 3MHz	**1**	**0**	23.247	23.022	**23.342**	22.344	22.369	22.383
	1	**7**	23.337	23.026	23.325	22.188	22.378	**22.454**
	1	**14**	23.16	23.02	23.246	22.145	22.315	22.342
	8	**0**	22.18	22.092	22.268	21.123	21.233	21.253
	8	**4**	22.158	22.043	22.268	21.12	21.189	21.216
	8	**7**	22.137	21.987	22.254	21.113	21.098	21.205
	15	**0**	22.164	22.062	22.238	21.139	21.08	21.204

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18625	18900	19175	18625	18900	19175
			1852.5MHz	1880.0MHz	1907.5MHz	1852.5MHz	1880.0MHz	1907.5MHz
Band 2 / 5MHz	**1**	**0**	**23.323**	23.287	23.308	22.355	**22.5**	22.291
	1	**13**	23.218	23.146	23.269	22.268	22.362	22.237
	1	**25**	23.198	23.191	23.268	22.306	22.383	22.238
	12	**0**	22.243	22.067	22.307	21.2	21.062	21.287
	12	**6**	22.207	22.072	22.289	21.091	21.062	21.299
	12	**13**	22.124	22.065	22.225	21.029	21.061	21.257
	25	**0**	22.187	22.067	22.285	21.179	21.065	21.291

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18650	18900	19150	18650	18900	19150
			1855.0MHz	1880.0MHz	1905.0MHz	1855.0MHz	1880.0MHz	1905.0MHz
Band 2 / 10MHz	**1**	**0**	23.281	23.071	**23.384**	22.293	22.472	22.347
	1	**25**	23.202	23.005	23.324	22.117	22.368	22.287
	1	**49**	23.215	23.052	23.335	22.078	22.421	**22.479**
	25	**0**	22.093	21.926	22.203	21.125	20.943	21.275
	25	**13**	22.075	22.003	22.248	21.146	21.012	21.301
	25	**25**	22.017	22.044	22.348	21.085	21.05	21.38
	50	**0**	22.123	21.991	22.216	21.129	20.984	21.202

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18675	18900	19125	18675	18900	19125
			1857.5MHz	1880.0MHz	1902.5MHz	1857.5MHz	1880.0MHz	1902.5MHz
Band 2 / 15MHz	**1**	**0**	23.286	23.212	**23.414**	22.318	**22.608**	22.358
	1	**38**	23.176	23.078	23.266	22.102	22.443	22.276
	1	**74**	23.251	23.143	23.31	22.175	22.545	22.343
	36	**0**	22.126	22.077	22.223	21.119	21.073	21.282
	36	**19**	22.087	22.152	22.257	21.112	21.132	21.319
	36	**39**	22.143	22.045	22.165	21.145	21.011	21.212
	75	**0**	22.101	22.07	22.239	21.098	21.056	21.258

Conducted Output Power (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			18700	18900	19100	18700	18900	19100
			1860.0MHz	1880.0MHz	1900.0MHz	1860.0MHz	1880.0MHz	1900.0MHz
Band 2 / 20MHz	**1**	**0**	22.98	23.138	23.192	22.499	22.089	**22.785**
	1	**49**	23.076	23.082	**23.225**	22.473	22.115	22.776
	1	**99**	22.73	22.688	22.819	22.156	21.483	22.364
	50	**0**	22.097	22.027	22.162	21.112	21.036	21.144
	50	**25**	22.098	22.117	22.222	21.151	21.115	21.259
	50	**50**	21.968	21.87	22.098	20.946	20.857	21.081
	100	**0**	22.074	21.962	22.208	21.095	20.967	21.209

1.6.4. Equivalent Isotropically Radiated Power (EIRP) – LTE Band 2 (1850-1910MHz)

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			19957	20175	20393	19957	20175	20393
			1710.7 MHz	1732.5 MHz	1754.3 MHz	1710.7 MHz	1732.5 MHz	1754.3 MHz
Band 4 / 1.4 MHz	**1**	**0**	24.268	24.208	24.468	23.335	23.218	23.313
	1	**3**	24.319	24.201	24.494	23.379	23.242	23.314
	1	**5**	24.286	24.143	**24.499**	23.305	23.144	23.291
	3	**0**	24.259	24.175	24.333	23.216	23.159	23.47
	3	**2**	24.271	24.177	24.406	23.252	23.155	**23.547**
	3	**3**	24.229	24.073	24.368	23.21	23.122	23.478
	6	**0**	23.202	23.123	23.288	22.188	22.086	22.385

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			19965	20175	20385	19965	20175	20385
			1711.5 MHz	1732.5 MHz	1753.5 MHz	1711.5 MHz	1732.5 MHz	1753.5 MHz
Band 4 / 3MHz	**1**	**0**	24.347	24.122	**24.442**	23.444	23.469	23.483
	1	**7**	24.437	24.126	24.425	23.288	23.478	**23.554**
	1	**14**	24.26	24.12	24.346	23.245	23.415	23.442
	8	**0**	23.28	23.192	23.368	22.223	22.333	22.353
	8	**4**	23.258	23.143	23.368	22.22	22.289	22.316
	8	**7**	23.237	23.087	23.354	22.213	22.198	22.305
	15	**0**	23.264	23.162	23.338	22.239	22.18	22.304

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			19975	20175	20375	19975	20175	20375
			1712.5MHz	1732.5MHz	1752.5MHz	1712.5MHz	1732.5MHz	1752.5MHz
Band 4 / 5MHz	**1**	**0**	**24.423**	24.387	24.408	23.455	**23.6**	23.391
	1	**13**	24.318	24.246	24.369	23.368	23.462	23.337
	1	**25**	24.298	24.291	24.368	23.406	23.483	23.338
	12	**0**	23.343	23.167	23.407	22.3	22.162	22.387
	12	**6**	23.307	23.172	23.389	22.191	22.162	22.399
	12	**13**	23.224	23.165	23.325	22.129	22.161	22.357
	25	**0**	23.287	23.167	23.385	22.279	22.165	22.391

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20000	20175	20350	20000	20175	20350
			1715MHz	1732.5MHz	1750MHz	1715MHz	1732.5MHz	1750MHz
Band 4 / 10MHz	**1**	**0**	24.381	24.171	**24.484**	23.393	23.572	23.447
	1	**25**	24.302	24.105	24.424	23.217	23.468	23.387
	1	**49**	24.315	24.152	24.435	23.178	23.521	**23.579**
	25	**0**	23.193	23.026	23.303	22.225	22.043	22.375
	25	**13**	23.175	23.103	23.348	22.246	22.112	22.401
	25	**25**	23.117	23.144	23.448	22.185	22.15	22.48
	50	**0**	23.223	23.091	23.316	22.229	22.084	22.302

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20025	20175	20325	20025	20175	20325
			1717.5MHz	1732.5MHz	1747.5MHz	1717.5MHz	1732.5MHz	1747.5MHz
Band 4 / 15MHz	**1**	**0**	24.386	24.312	**24.514**	23.418	**23.708**	23.458
	1	**38**	24.276	24.178	24.366	23.202	23.543	23.376
	1	**74**	24.351	24.243	24.41	23.275	23.645	23.443
	36	**0**	23.226	23.177	23.323	22.219	22.173	22.382
	36	**19**	23.187	23.252	23.357	22.212	22.232	22.419
	36	**39**	23.243	23.145	23.265	22.245	22.111	22.312
	75	**0**	23.201	23.17	23.339	22.198	22.156	22.358

EIRP (dBm)								
LTE Band/BW	RB Size	RB Offset	QPSK Modulation			16QAM Modulation		
			Low CH	Mid CH	High CH	Low CH	Mid CH	High CH
			20050	20175	20300	20050	20175	20300
			1720MHz	1732.5MHz	1745MHz	1720MHz	1732.5MHz	1745MHz
Band 4 / 20MHz	**1**	**0**	24.08	24.238	24.292	23.599	23.189	**23.885**
	1	**49**	24.176	24.182	**24.325**	23.573	23.215	23.876
	1	**99**	23.83	23.788	23.919	23.256	22.583	23.464
	50	**0**	23.197	23.127	23.262	22.212	22.136	22.244
	50	**25**	23.198	23.217	23.322	22.251	22.215	22.359
	50	**50**	23.068	22.97	23.198	22.046	21.957	22.181
	100	**0**	23.174	23.062	23.308	22.195	22.067	22.309

The maximum ERP/EIRP from the measured RF output power is given in Equation as follows:

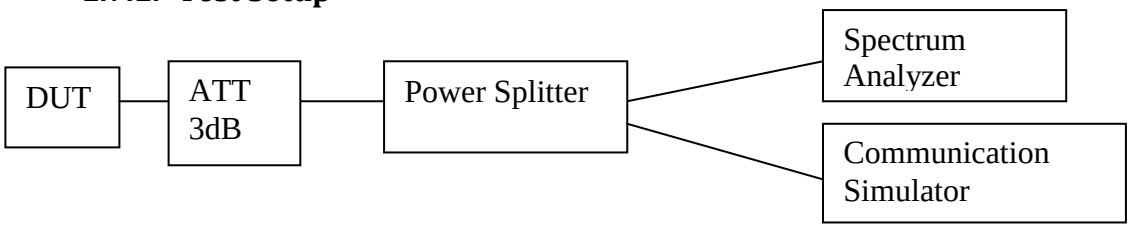
$$\mathbf{EIRP} = \mathbf{P_{Meas}} + \mathbf{G_T}$$
$$\mathbf{ERP} = \mathbf{EIRP} - \mathbf{2.15}$$

Where, ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (Expressed in the same units as PMeas, e.g., dBm)

$\mathbf{P_{Meas}}$ measured transmitter output power, in dBm
$\mathbf{G_T}$ gain of the transmitting antenna, in dBi (EIRP)

1.7. Peak-to-Average Power Ratio

1.7.1. Test Setup



1. The DUT transmitter output port was connected to communication simulator with above setup.
2. Path loss for the measurement included.
3. Set DUT to transmit maximum power through communication simulator
4. Set the CCDF (Complementary Cumulative Distribution Function) option in the spectrum analyzer.
5. Spectrum Analyzer setting, RBW = 20MHz.
6. Recorded the maximum PAR level associated with a probability of 0.1% as Peak to Average Ratio.
7. All the measurement was done at low, mid, high channel for each band and different modulation.

1.7.2. Test Limit

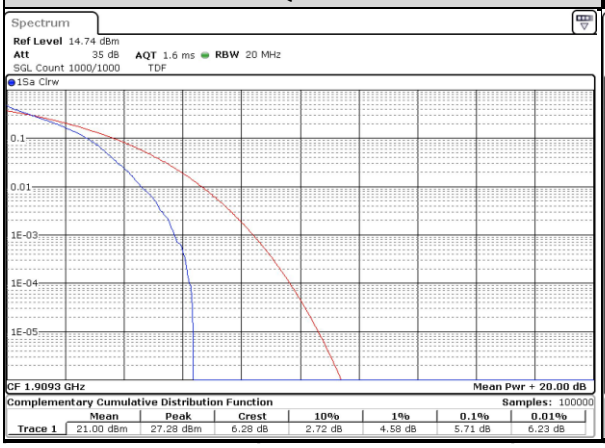
In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

1.7.3. Peak-to-Average Power Ratio – LTE Band 2 (1850-1910MHz)

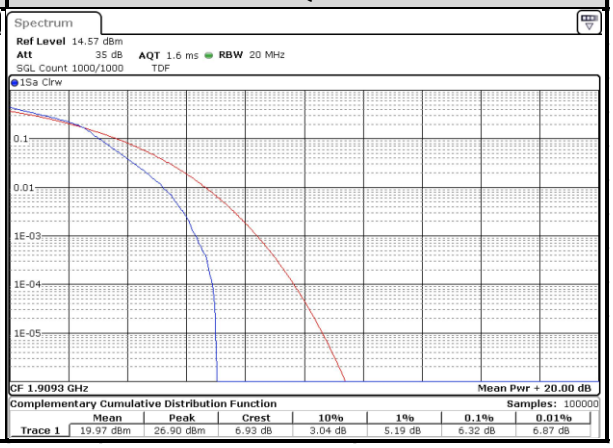
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/1.4MHz/6/0	Low CH 18607	1850.7 MHz	5.42	6.087
	Mid CH 18900	1880 MHz	5.507	6.058
	High CH 19193	1909.3 MHz	**5.71**	**6.319**

Spectrum Plot of Worst Value

QPSK



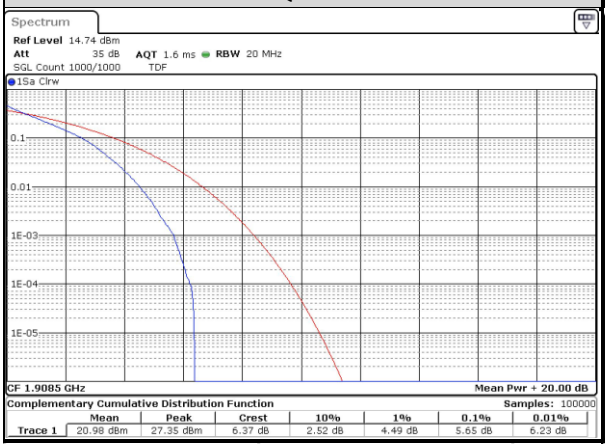
16QAM



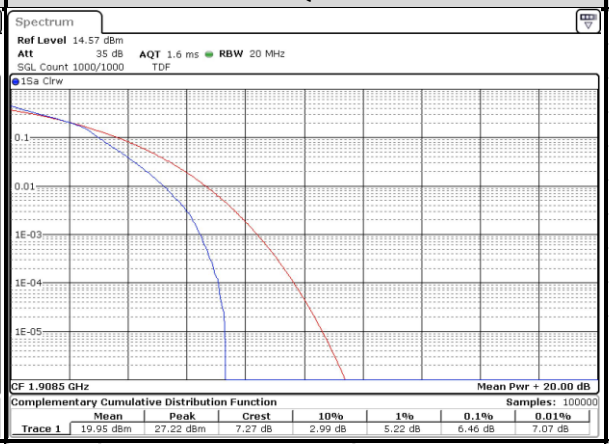
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/3MHz/15/0	Low CH 18615	1851.5 MHz	5.275	5.942
	Mid CH 18900	1880 MHz	5.304	6.087
	High CH 19185	1908.5 MHz	**5.652**	**6.464**

Spectrum Plot of Worst Value

QPSK



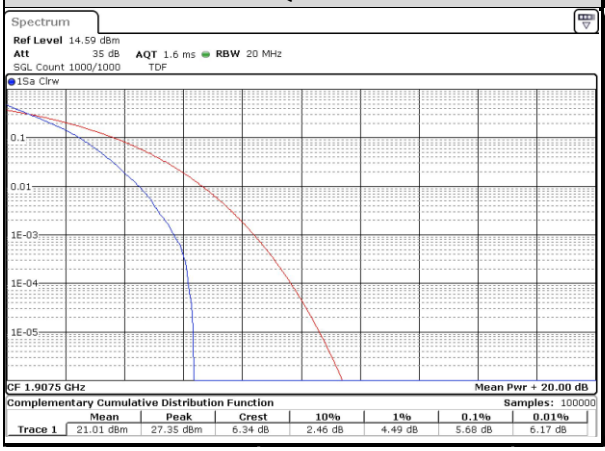
16QAM



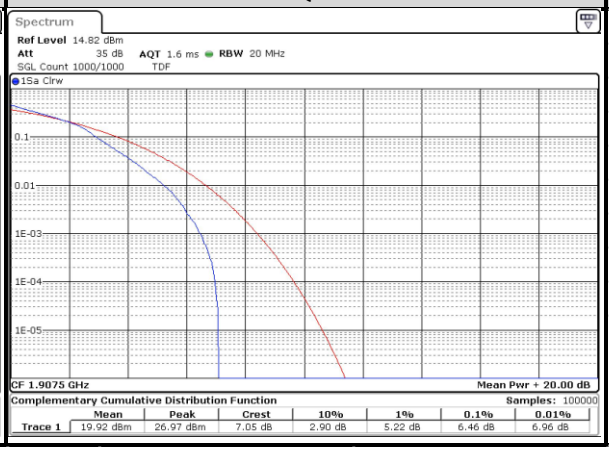
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/5MHz/25/0	Low CH 18625	1852.5 MHz	5.188	5.942
	Mid CH 18900	1880 MHz	5.246	5.971
	High CH 19175	1907.5 MHz	**5.681**	**6.464**

Spectrum Plot of Worst Value

QPSK



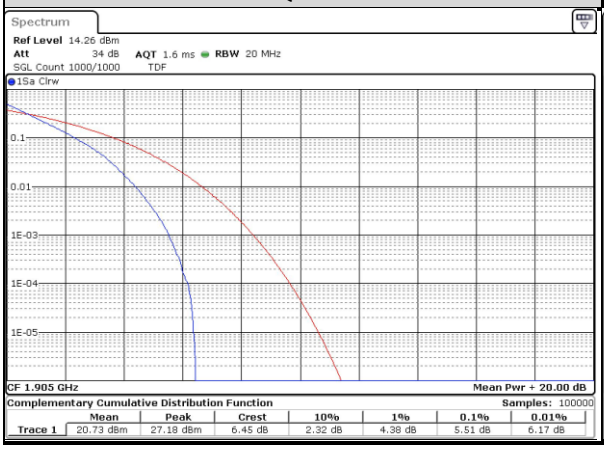
16QAM



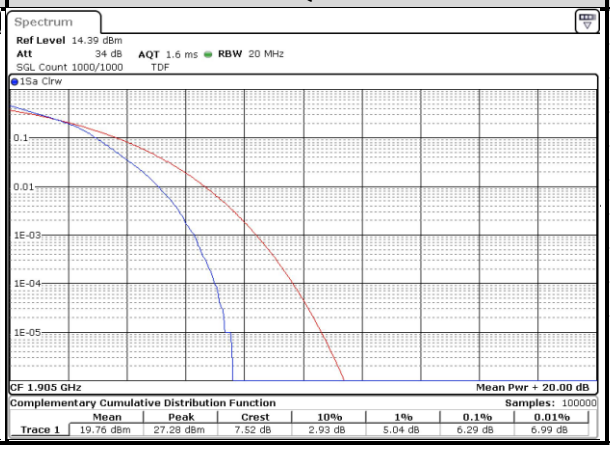
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/10MHz/50/0	Low CH 18650	1855 MHz	5.275	6.058
	Mid CH 18900	1880 MHz	5.362	6
	High CH 19150	1905 MHz	**5.507**	**6.29**

Spectrum Plot of Worst Value

QPSK



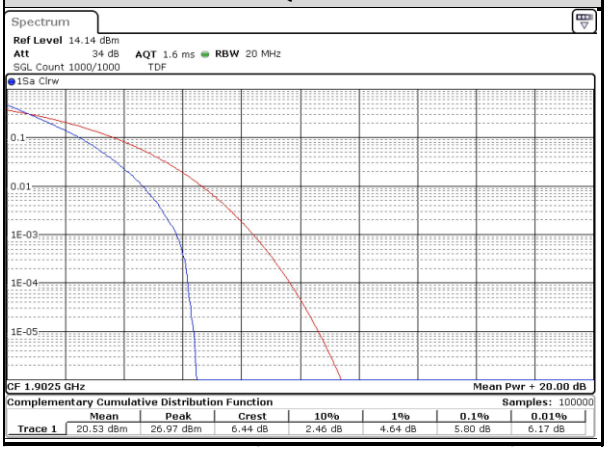
16QAM



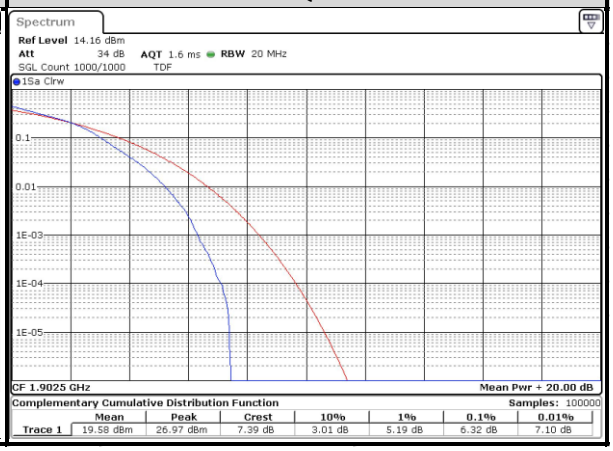
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/15MHz/75/0	Low CH 18675	1857.5 MHz	5.681	6.145
	Mid CH 18900	1880 MHz	5.652	6.116
	High CH 19125	1902.5 MHz	**5.797**	**6.319**

Spectrum Plot of Worst Value

QPSK



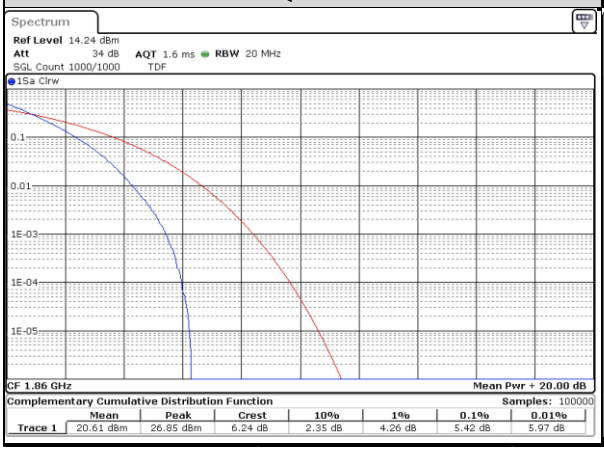
16QAM



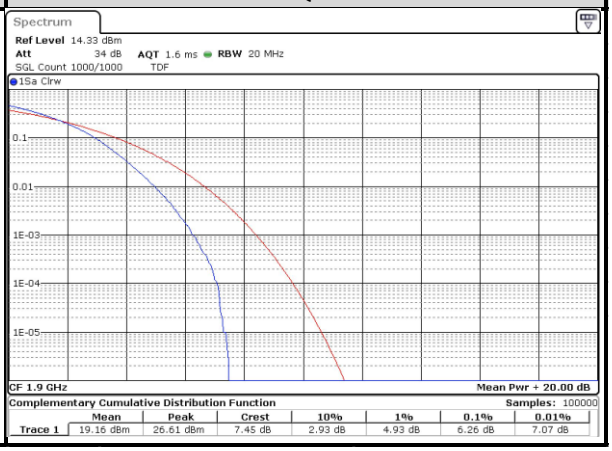
LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	Peak To Average (dB)	
			QPSK Modulation	16QAM Modulation
Band 2/ 20MHz/100/0	Low CH 18700	1860 MHz	**5.42**	6.203
	Mid CH 18900	1880 MHz	5.362	6.116
	High CH 19100	1900 MHz	5.304	**6.261**

Spectrum Plot of Worst Value

QPSK

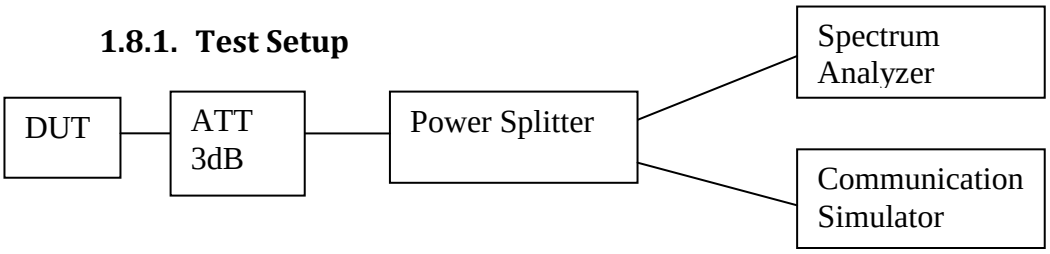


16QAM



1.8. Occupied Bandwidth

1.8.1. Test Setup



1) The DUT transmitter output port was connected to communication simulator with above setup.
2) Path loss for the measurement included.
3) For LTE measurement, set DUT to transmit maximum power & full RB size through communication simulator.
4) For LTE measurement, set DUT to transmit maximum power through communication simulator.
5) Spectrum Analyzer setting, RBW is 1% of OBW and VBW is 3 times of RBW.
6) Measure & record -26dBc and 99% occupied bandwidth (BW).
7) All the measurement was done at low, mid, high channel for each band and different modulation.

1.8.2. Test Limit

FCC: The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

ISED: Emission bandwidth is, for the purpose of this document, defined as the width of the signal between two points, one below the carrier frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 20 dB below the transmitter power (i.e. -20 dBc), when measured with a resolution bandwidth of approximately 1% of the occupied bandwidth. In lieu of the -20 dBc bandwidth, the occupied bandwidth may be used.

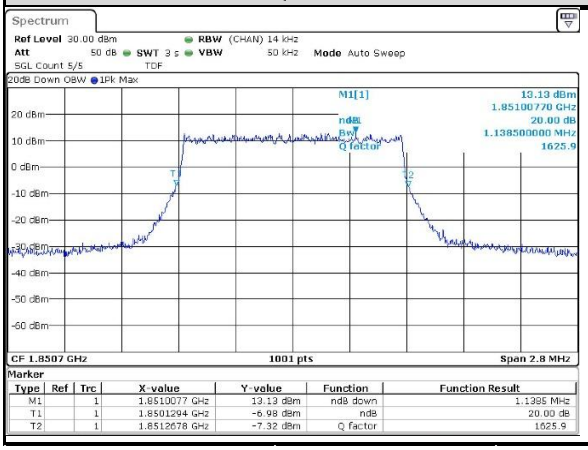
1.8.3. Occupied Bandwidth – c

LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/1.4MHz/6/0	Low CH 18607	1850.7 MHz	**1.139**	1.122
	Mid CH 18900	1880 MHz	1.127	**1.144**
	High CH 19193	1909.3 MHz	1.136	1.13

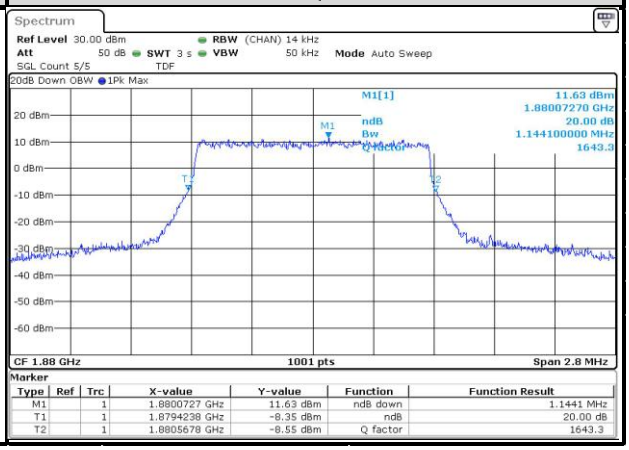
Spectrum Plot of Worst Value

-20 dBC Bandwidth

QPSK



16QAM

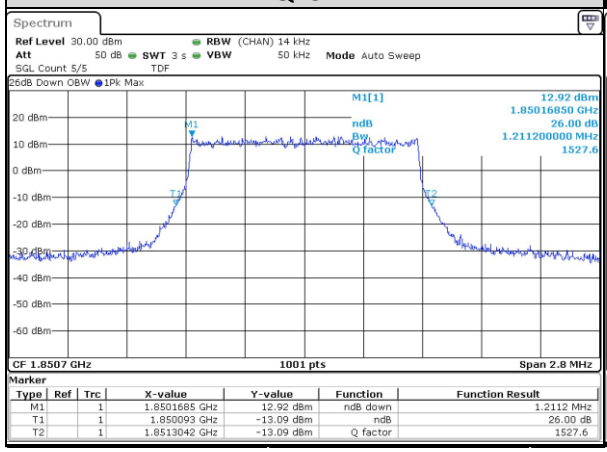


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/1.4MHz/6/0	Low CH 18607	1850.7 MHz	**1.211**	1.183
	Mid CH 18900	1880 MHz	1.197	**1.222**
	High CH 19193	1909.3 MHz	1.208	1.206

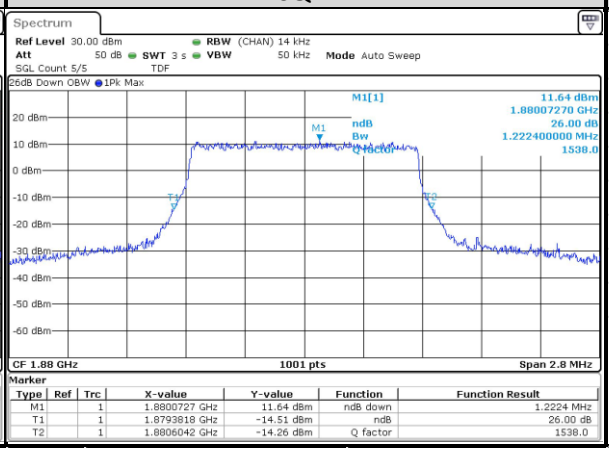
Spectrum Plot of Worst Value

-26 dBC Bandwidth

QPSK



16QAM

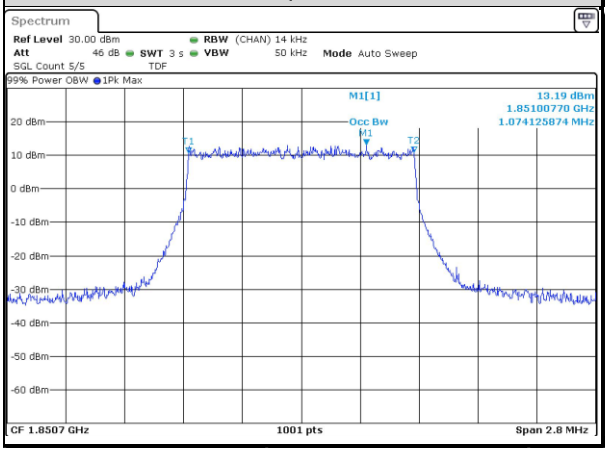


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/1.4MHz/6/0	Low CH 18607	1850.7 MHz	**1.074**	1.071
	Mid CH 18900	1880 MHz	1.074	**1.074**
	High CH 19193	1909.3 MHz	1.071	1.074

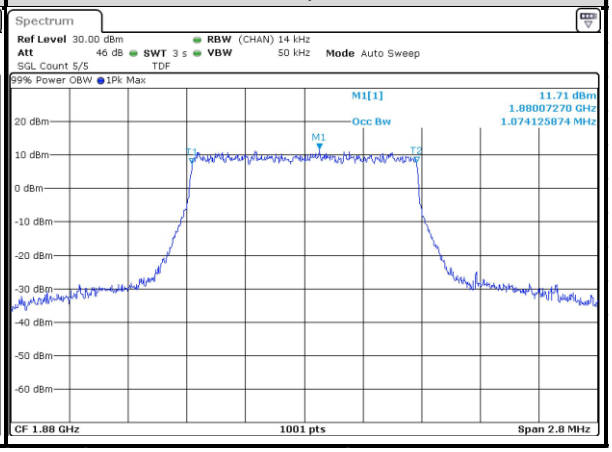
Spectrum Plot of Worst Value

99% Occupied Bandwidth

QPSK



16QAM

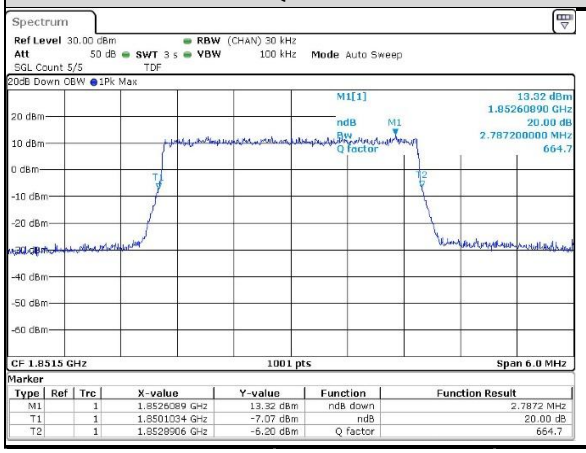


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/3MHz/15/0	Low CH 18615	1851.5 MHz	**2.787**	2.793
	Mid CH 18900	1880 MHz	2.775	2.793
	High CH 19185	1908.5 MHz	2.775	**2.799**

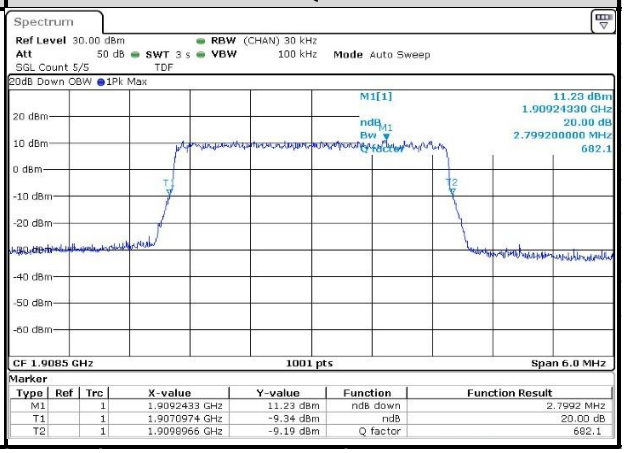
Spectrum Plot of Worst Value

-20 dBC Bandwidth

QPSK



16QAM

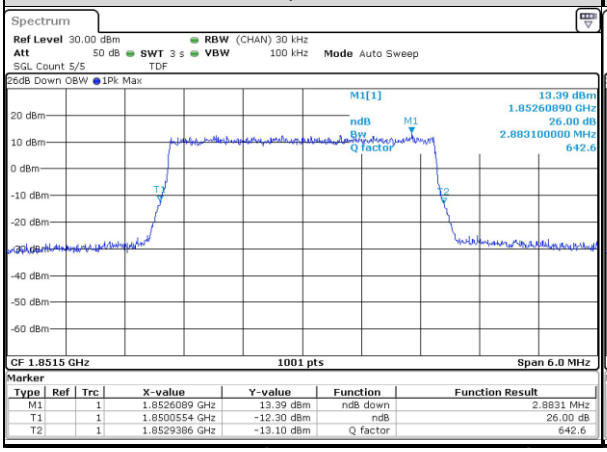


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/3MHz/15/0	Low CH 18615	1851.5 MHz	**2.883**	2.877
	Mid CH 18900	1880 MHz	2.883	**2.883**
	High CH 19185	1908.5 MHz	2.865	2.883

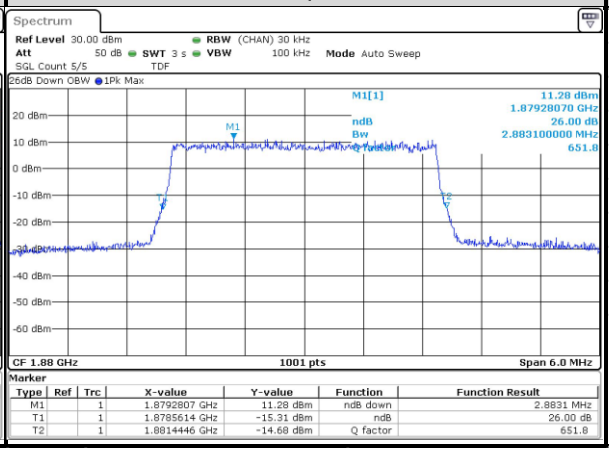
Spectrum Plot of Worst Value

-26 dBC Bandwidth

QPSK



16QAM

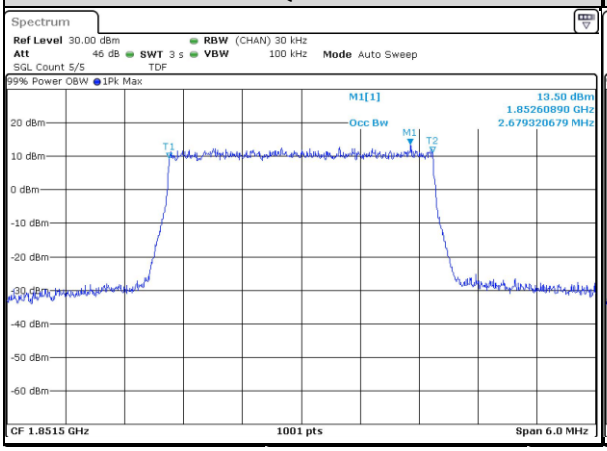


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/3MHz/15/0	Low CH 18615	1851.5 MHz	**2.679**	**2.673**
	Mid CH 18900	1880 MHz	2.673	2.673
	High CH 19185	1908.5 MHz	2.673	2.673

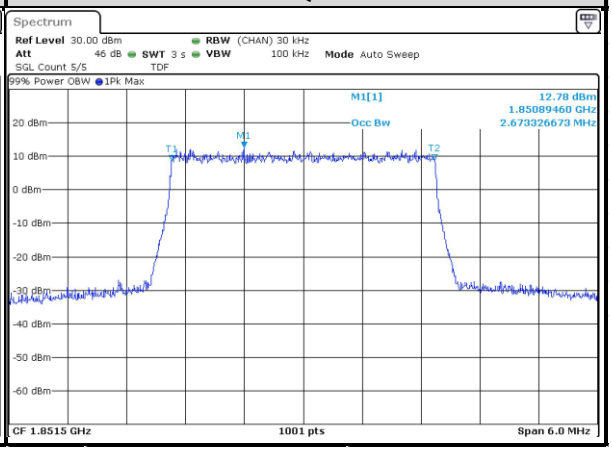
Spectrum Plot of Worst Value

99% Occupied Bandwidth

QPSK



16QAM

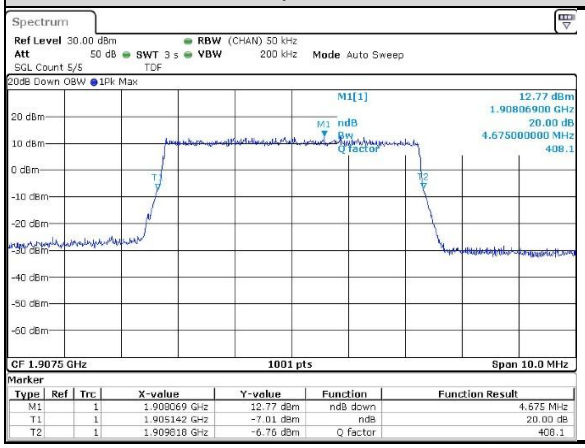


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/5MHz/25/0	Low CH 18625	1852.5 MHz	4.665	**4.685**
	Mid CH 18900	1880 MHz	4.635	4.645
	High CH 19175	1907.5 MHz	**4.675**	4.655

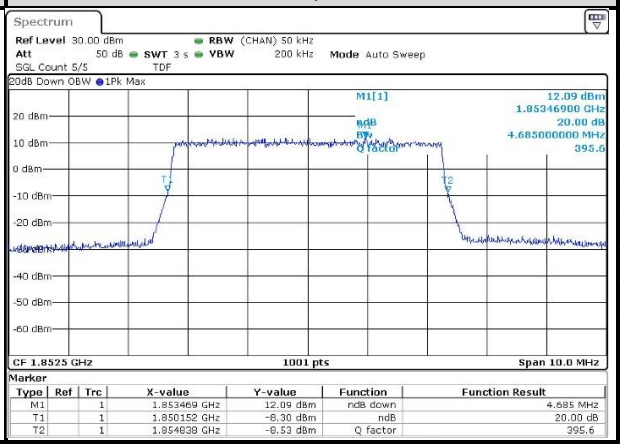
Spectrum Plot of Worst Value

-20 dBC Bandwidth

QPSK



16QAM

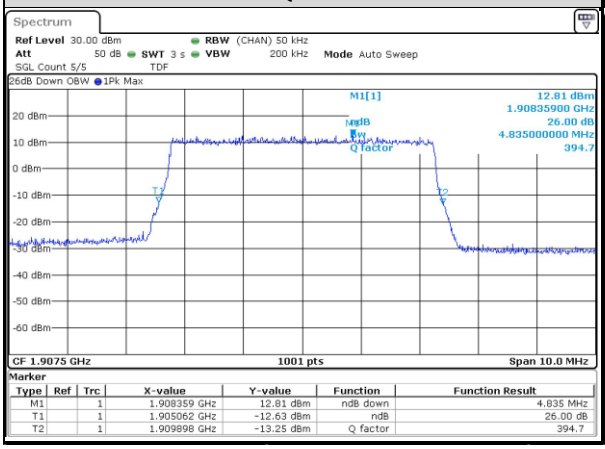


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/5MHz/25/0	Low CH 18625	1852.5 MHz	4.825	4.835
	Mid CH 18900	1880 MHz	4.785	4.785
	High CH 19175	1907.5 MHz	**4.835**	**4.845**

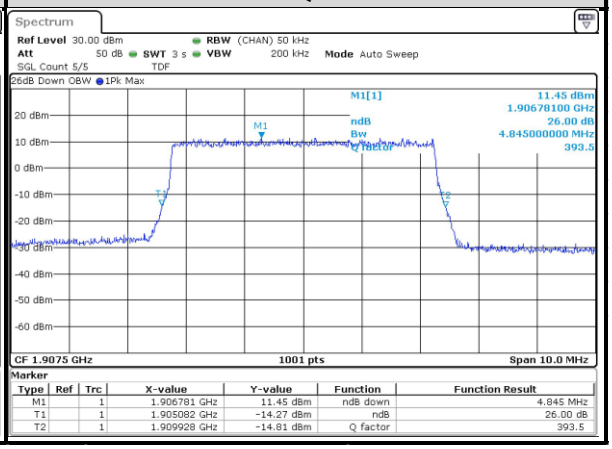
Spectrum Plot of Worst Value

-26 dBC Bandwidth

QPSK



16QAM

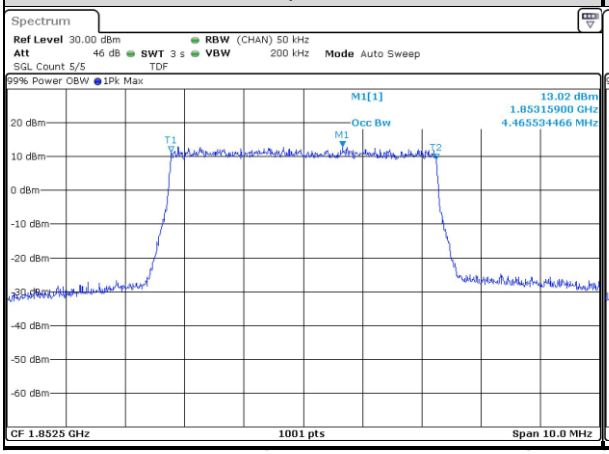


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/5MHz/25/0	Low CH 18625	1852.5 MHz	**4.466**	**4.476**
	Mid CH 18900	1880 MHz	4.456	4.466
	High CH 19175	1907.5 MHz	4.466	4.466

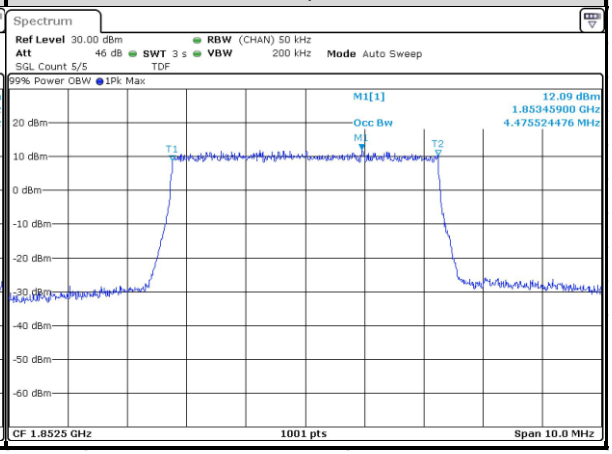
Spectrum Plot of Worst Value

99% Occupied Bandwidth

QPSK



16QAM

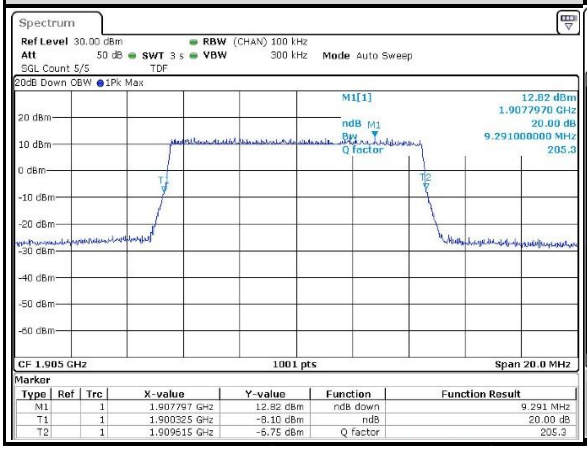


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/10MHz/50/0	Low CH 18650	1855 MHz	9.271	**9.251**
	Mid CH 18900	1880 MHz	9.251	9.231
	High CH 19150	1905 MHz	**9.291**	9.211

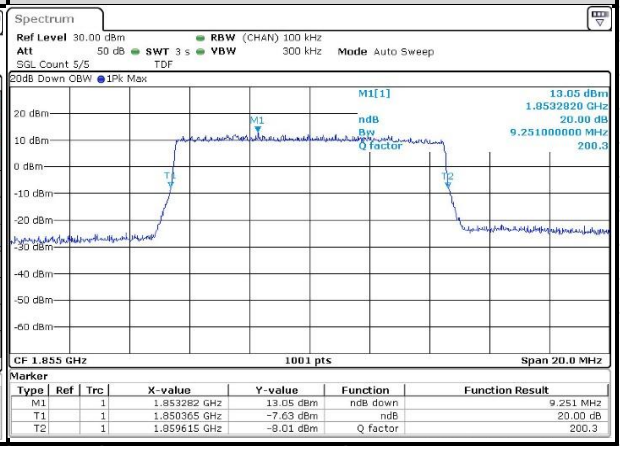
Spectrum Plot of Worst Value

-20 dBC Bandwidth

QPSK



16QAM

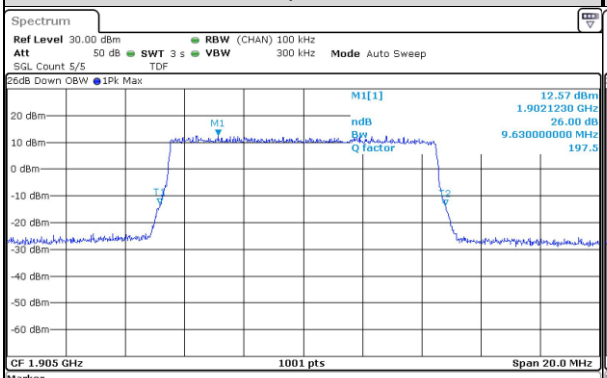


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/10MHz/50/0	Low CH 18650	1855 MHz	9.55	**9.53**
	Mid CH 18900	1880 MHz	9.55	9.53
	High CH 19150	1905 MHz	**9.63**	9.491

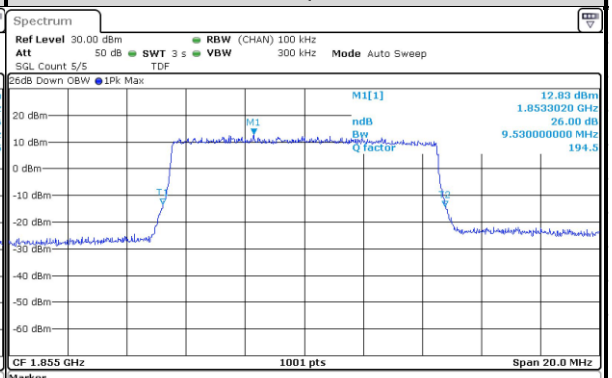
Spectrum Plot of Worst Value

-26 dBC Bandwidth

QPSK



16QAM

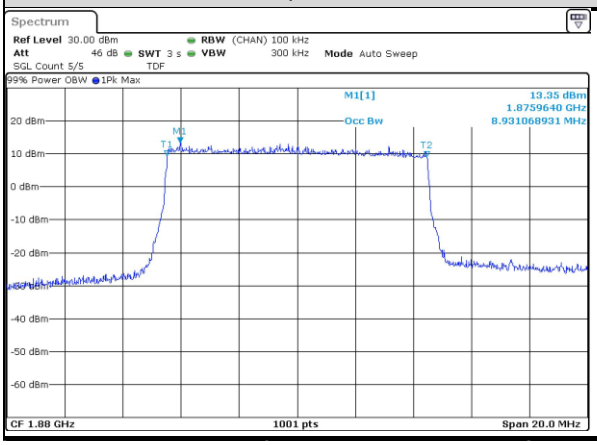


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/10MHz/50/0	Low CH 18650	1855 MHz	8.911	8.911
	Mid CH 18900	1880 MHz	**8.931**	**8.931**
	High CH 19150	1905 MHz	8.911	8.911

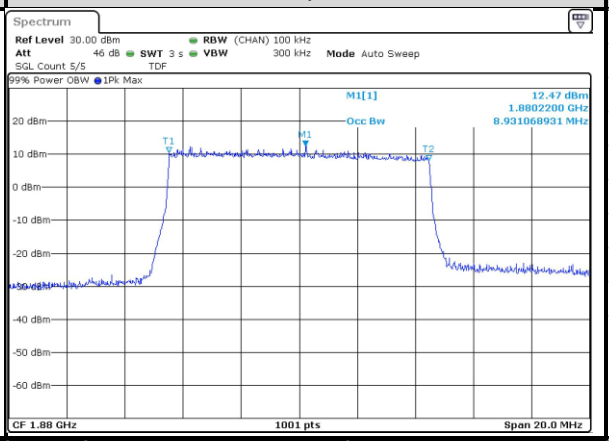
Spectrum Plot of Worst Value

99% Occupied Bandwidth

QPSK



16QAM

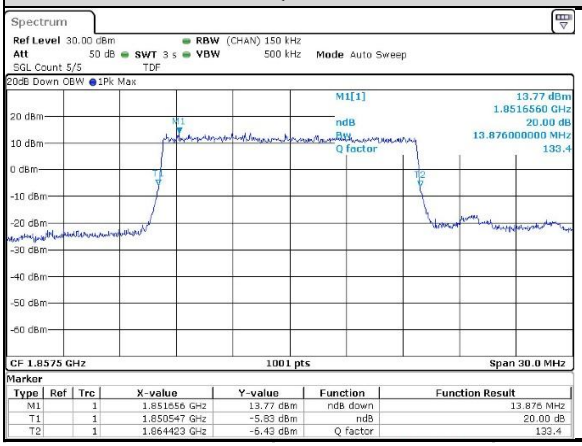


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/15MHz/75/0	Low CH 18675	1857.5 MHz	**13.876**	**13.846**
	Mid CH 18900	1880 MHz	13.876	13.816
	High CH 19125	1902.5 MHz	13.846	1.816

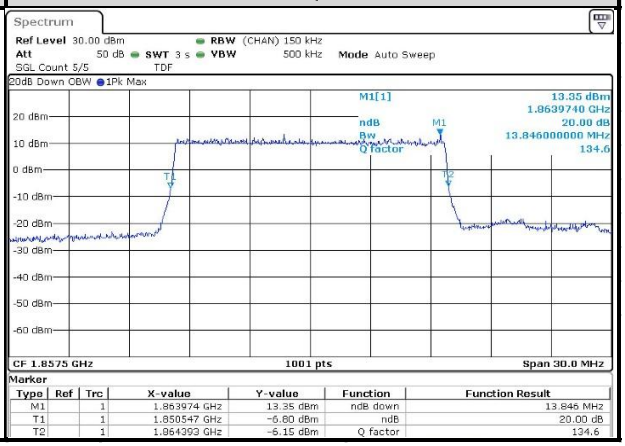
Spectrum Plot of Worst Value

-20 dBC Bandwidth

QPSK



16QAM

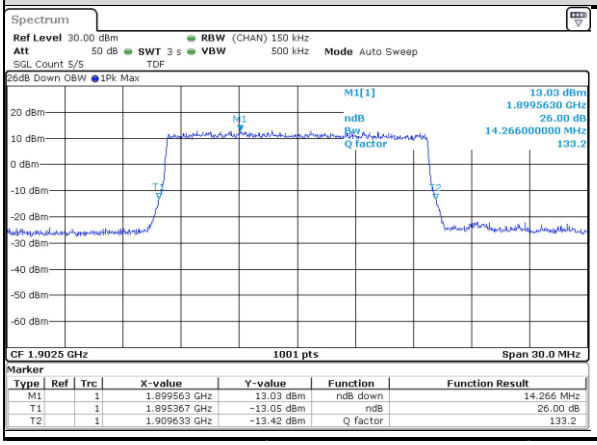


LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-26 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/15MHz/75/0	Low CH 18675	1857.5 MHz	14.236	14.176
	Mid CH 18900	1880 MHz	14.236	14.146
	High CH 19125	1902.5 MHz	**14.266**	**14.206**

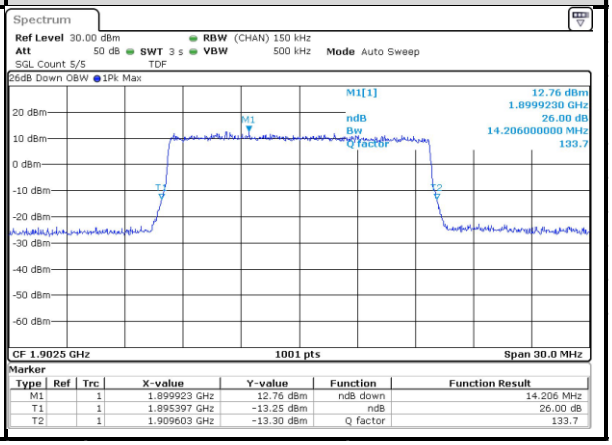
Spectrum Plot of Worst Value

-26 dBC Bandwidth

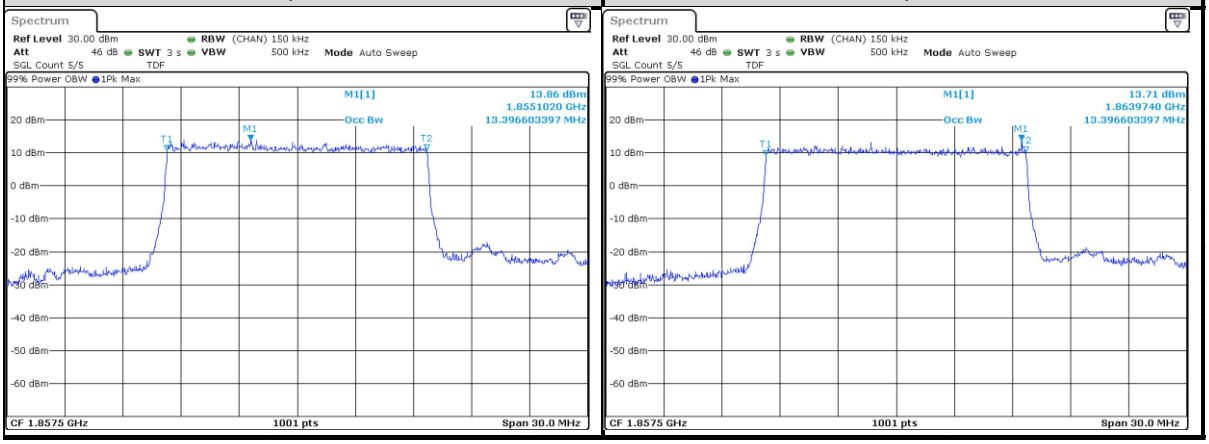
QPSK



16QAM



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	99% Occupied Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/15MHz/75/0	Low CH 18675	1857.5 MHz	**13.397**	**13.397**
	Mid CH 18900	1880 MHz	13.397	13.397
	High CH 19125	1902.5 MHz	13.367	13.367
Spectrum Plot of Worst Value				
99% Occupied Bandwidth				
QPSK			16QAM	



LTE Band/BW/RB Size/RB Offset	Channel Number	Tx Frequency	-20 dBc Bandwidth (MHz)	
			QPSK Modulation	16QAM Modulation
Band 2/20MHz/100/0	Low CH 18700	1860 MHz	**18.501**	**18.501**
	Mid CH 18900	1880 MHz	18.501	18.462
	High CH 19100	1900 MHz	18.422	18.422
Spectrum Plot of Worst Value				
-20 dBC Bandwidth				
QPSK			16QAM