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## FCC 47 CFR PART 22 SUBPART H

## **TEST REPORT**

For

### **GUARDIAN SYSTEM LTE**

Model No.: G2-SY-CON2

### **Trade Name: GUARDIAN**

Issued to

Seeing Machines Pty Ltd 80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia

Issued by

Compliance Certification Services Inc. Wugu Laboratory No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.) Issued Date: June 6, 2020

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。

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# **Revision History**

Rev.	lssue Date	Revisions	Effect Page	Revised By
00	January 22, 2020	Initial Issue	ALL	Doris Chu
01	May 29, 2020	See the following Note Rev. (01)	P.1, P.4, P.6, P.21-23, P.55-64	May Lin
02	June 6, 2020	See the following Note Rev. (02)	P.33, P.39-43	Allison Chen

Rev (01):

1. Remove IC information.

2. Revised the section 2  $\,{\scriptstyle \sim}$  8.2  $\,{\scriptstyle \cdot}$  8.5.

Rev (02):

1. Revised the section 8.4



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# 1. TEST RESULT CERTIFICATION

Applicant:	Seeing Machines Pty Ltd 80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia
Manufacturer:	ADLINK TECHNOLOGY INC. 9F, No. 166, Jian Yi Rd., Zhonghe Dist., New Taipei City, 235 Taiwan
Equipment Under Test:	GUARDIAN SYSTEM LTE
Trade Name:	GUARDIAN
Model No.:	G2-SY-CON2
Date of Test:	December 20, 2019 ~ January 8, 2020



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APPLICABLE STANDARDS					
STANDARD	TEST RESULT				
FCC 47 CFR PART 22 SUBPART H	No non-compliance noted				
Statements of Conform	Statements of Conformity				
Determination of compliance is based on the results of the compliance measurement not taking into account measurement instrumentation uncertainty.					

#### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA -603-E and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 22 Subpart H.

Approved by:

Komil Tsori

Kevin Tsai Deputy Manager Compliance Certification Services Inc.



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# 2. EUT DESCRIPTION

Product	GUARDIAN SYSTEM LTE				
Model No.	G2-SY-CON2				
Model Discrepancy	N/A				
Trade	GUARDIAN				
Received Date	November 20, 2019				
Power Supply	Powered from DC supply: DC 1	2V.			
Frequency Range	LTE Band 26 Channel Bandwidth: 1.4MHz	824.7MHz ~ 843	.3MHz		
	LTE Band 26 Channel Bandwidth: 3MHz	825.5MHz ~ 847	.5MHz		
	LTE Band 26 Channel Bandwidth: 5MHz	826.5MHz ~ 846	.5MHz		
	LTE Band 26 Channel Bandwidth: 10MHz	829MHz ~ 841M	Hz		
	LTE Band 26 Channel Bandwidth: 15MHz 831.5MHz ~ 841.5MHz				
Modulation Technique	LTE Band 26	QPSK, 16QAM			
Antenna Specification	Dipole Antenna Antenna gain: -0.1 dBi				
	LTE Band 26	QPSK: 19	).98 dBm		
	Channel Bandwidth: 1.4MHz	16QAM: 19	9.53 dBm		
	LTE Band 26	QPSK: 19	).99 dBm		
	Channel Bandwidth: 3MHz	16QAM: 19	).54 dBm		
Transmit Power	LTE Band 26	QPSK: 20	).04 dBm		
(ERP Power)	Channel Bandwidth: 5MHz	16QAM: 19	9.59 dBm		
	LTE Band 26	QPSK: 20	).06 dBm		
	Channel Bandwidth: 10MHz		9.61 dBm		
	LTE Band 26	QPSK: 20	).10 dBm		
	Channel Bandwidth: 15MHz	16QAM: 19	9.65 dBm		
HW Version	V1				
SW Version	V9				

**Remark:** The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.



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# 3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of TIA-603-E and FCC CFR 47, Part 2 and Part 22 Subpart H, KDB 971168 D01 Power Meas License Digital Systems.

### **3.1 EUT CONFIGURATION**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### 3.2 DESCRIPTION OF TEST MODES

The EUT (Model: G2-SY-CON2) had been tested under operating condition. The EUT be set in maximum power transmission via call box during testing.

#### LTE Band 26: 824 MHz ~ 849 MHz

Three channels had been tested for each channel bandwidth.

Channel	1.4	1MHz	3	MHz	51	MHz
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	26797	824.7	26805	825.5	26815	826.5
Middle channel (M)	26915	836.5	26915	836.5	26915	836.5
High channel (H)	27033	848.3	27025	847.5	27015	846.5
Channel	10MHz		15MHz			
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
Low channel (L)	26840	829	26865	831.5		
Middle channel (M)	26915	836.5	26915	836.5		
High channel (H)	26960	841	26965	841.5		



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#### **3.2.1** The worst mode of measurement

Radiated Emission Measurement Above 1G				
Test Condition Radiated Emission Above 1G				
Power supply Mode	Mode 1: EUT power by Power supply			
Worst Mode	🛛 Mode 1 🗌 Mode 2 🗌 Mode 3 🗌 Mode 4			
Worst Position	<ul> <li>Placed in fixed position.</li> <li>Placed in fixed position at X-Plane (E2-Plane)</li> <li>Placed in fixed position at Y-Plane (E1-Plane)</li> <li>Placed in fixed position at Z-Plane (H-Plane)</li> </ul>			

Radiated Emission Measurement Below 1G					
Test Condition	Test Condition Radiated Emission Below 1G				
Power supply Mode Mode 1: EUT power by Power supply					
Worst Mode         Mode 1         Mode 2         Mode 3         Mode 4					

Remark:

1. The worst mode was record in this test report.

2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report



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# 4. TEST SUMMERY

FCC Standard Sec.	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
22.913(a)	8.1	ERP and EIRP Measurement	Pass
2.1055, 22.355	8.2	Frequency Stability v.s. temperature measurement	Pass
2.1049	8.3	Occupied Bandwidth Measurement	Pass
22.917(a)	8.4	Conducted Band Edge	Pass
22.913(d)	8.5	Peak to Average Ratio	Pass
22.917(a)	8.6	Conducted Spurious Emission	Pass
22.917(a)	8.7	Spurious Radiation Measurement	Pass



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# 5. INSTRUMENT CALIBRATION

# 5.1 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
Radiation	Jerry Chang	-
RF Conducted	Dally Hong	-

**Remark:** The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



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### 5.2 MEASUREMENT EQUIPMENT USED

#### **Equipment Used for Emissions Measurement**

Remark: Each piece of equipment is scheduled for calibration once a year.

RF Conducted Test Site						
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due	
Coaxial Cable	Woken	WC12	CC001	06/28/2019	06/27/2020	
Coaxial Cable	Woken	WC12	CC003	06/28/2019	06/27/2020	
Power Divider	Solvang Technology	STI08-0015	008	08/06/2019	08/05/2020	
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020	
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020	
<b>DC Power Supplies</b>	GW Instek	SPS-3610	GPE880163	01/14/2019	2020/1/13	
Software			N/A			

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/26/2019	02/25/2020
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Coaxial Cable	EMCI	EMC105	190914+25111	09/20/2019	09/19/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	10/04/2019	10/03/2020
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software		e3 (	6.11-20180413		



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## 5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

**Remark**: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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# 6. FACILITIES AND ACCREDITATIONS

## 6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
 Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)
 Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

### 6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 6.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.



# 7. SETUP OF EQUIPMENT UNDER TEST

# 7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

### 7.2 SUPPORT EQUIPMENT

No.	Equipment	Brand	Model	Series No.	FCC ID	IC ID
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H	1000M-7260H

#### Remark:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



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# 8. FCC PART 22 REQUIREMENTS

### 8.1 ERP & EIRP MEASUREMENT

### **LIMIT**

#### According to FCC §2.1046

FCC 22.913(b):

The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

### **TEST PROCEDURES**

### CONDUCTED POWER MEASUREMENT:

- 1. The transmitter output power was connected to the call box.
- 2. Set EUT at maximum output power via call box.
- 3. Set Call box at lowest, middle and highest channels for each band and modulation.

# **TEST RESULTS**

No non-compliance noted.



#### LTE Band 26

	Bunc								
Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
					1	0	0	21.99	19.74
					1	2	0	22.23	19.98
				QPSK	1	5	0	22.14	19.89
					3	0	1	21.41	19.16
					3	1	1	21.33	19.08
					3	2	1	21.29	19.04
		26707	0247		6	0	1	21.39	19.14
		26797	824.7		1	0	1	21.53	19.28
					1	2	1	21.51	19.26
					1	5	1	21.78	19.53
				16QAM	3	0	2	20.36	18.11
					3	1	2	20.29	18.04
					3	2	2	20.26	18.01
					6	0	2	20.49	18.24
					1	0	0	22.15	19.90
				QPSK	1	2	0	22.11	19.86
					1	5	0	22.07	19.82
					3	0	1	21.20	18.95
					3	1	1	21.14	18.89
					3	2	1	21.15	18.90
Dand 26	1 4 4 4	.4M 26915	836.5		6	0	1	21.16	18.91
Band 26	1.4111		6.0		1	0	1	21.66	19.41
					1	2	1	21.50	19.25
					1	5	1	21.39	19.14
				16QAM	3	0	2	20.24	17.99
					3	1	2	20.20	17.95
					3	2	2	20.08	17.83
					6	0	2	20.17	17.92
					1	0	0	22.11	19.86
					1	2	0	22.12	19.87
					1	5	0	21.14	18.89
				QPSK	3	0	1	21.35	19.10
					3	1	1	21.13	18.88
					3	2	1	21.11	18.86
		27033	848.3		6	0	1	21.28	19.03
		2,000	0-0.0		1	0	1	21.18	18.93
					1	2	1	21.38	19.13
					1	5	1	21.09	18.84
				16QAM		0	2	20.33	18.08
					3	1	2	20.15	17.90
					3	2	2	20.18	17.93
					6	0	2	20.38	18.13



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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
					1	0	0	22.00	19.75
					1	7	0	22.24	19.99
				QPSK	1	14	0	22.15	19.90
					8	0	1	21.42	19.17
					8	4	1	21.34	19.09
					8	7	1	21.30	19.05
		26905	925 F		15	0	1	21.40	19.15
		26805	825.5		1	0	1	21.54	19.29
					1	7	1	21.52	19.27
					1	14	1	21.79	19.54
				16QAM	8	0	2	20.37	18.12
					8	4	2	20.30	18.05
					8	7	2	20.27	18.02
					15	0	2	20.50	18.25
					1	0	0	22.16	19.91
			836.5	QPSK	1	7	0	22.12	19.87
					1	14	0	22.08	19.83
					8	0	1	21.21	18.96
					8	4	1	21.15	18.90
					8	7	1	21.16	18.91
De el 26	214	20045			15	0	1	21.17	18.92
Band 26	3M	26915		16QAM	1	0	1	21.67	19.42
					1	7	1	21.51	19.26
					1	14	1	21.40	19.15
					8	0	2	20.25	18.00
					8	4	2	20.21	17.96
					8	7	2	20.09	17.84
					15	0	2	20.18	17.93
					1	0	0	22.13	19.88
					1	7	0	22.14	19.89
					1	14	0	21.16	18.91
				QPSK	8	0	1	21.37	19.12
					8	4	1	21.15	18.90
					8	7	1	21.13	18.88
		27025	847.5		15	0	1	21.30	19.05
		27025	047.5		1	0	1	21.20	18.95
					1	7	1	21.40	19.15
					1	14	1	21.11	18.86
				16QAM	8	0	2	20.35	18.10
					8	4	2	20.17	17.92
					8	7	2	20.20	17.95
					15	0	2	20.40	18.15



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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
					1	0	0	22.05	19.80
				QPSK	1	12	0	22.29	20.04
					1	24	0	22.20	19.95
					12	0	1	21.47	19.22
					12	6	1	21.39	19.14
					12	11	1	21.35	19.10
		26815	926 F		25	0	1	21.45	19.20
		20812	826.5		1	0	1	21.59	19.34
					1	12	1	21.57	19.32
					1	24	1	21.84	19.59
				16QAM	12	0	2	20.42	18.17
					12	6	2	20.35	18.10
					12	11	2	20.32	18.07
					25	0	2	20.55	18.30
				QPSK	1	0	0	22.20	19.95
					1	12	0	22.16	19.91
					1	24	0	22.12	19.87
					12	0	1	21.25	19.00
					12	6	1	21.19	18.94
					12	11	1	21.20	18.95
Daniel 20	<b>FN</b> 4	20015	92C F		25	0	1	21.21	18.96
Band 26	5M	26915	836.5	16QAM	1	0	1	21.71	19.46
					1	12	1	21.55	19.30
					1	24	1	21.44	19.19
					12	0	2	20.29	18.04
					12	6	2	20.25	18.00
					12	11	2	20.13	17.88
					25	0	2	20.22	17.97
					1	0	0	22.18	19.93
					1	12	0	22.19	19.94
					1	24	0	21.21	18.96
				QPSK	12	0	1	21.42	19.17
					12	6	1	21.20	18.95
					12	11	1	21.18	18.93
		27015	046 F		25	0	1	21.35	19.10
		27015	846.5		1	0	1	21.25	19.00
					1	12	1	21.45	19.20
					1	24	1	21.16	18.91
				16QAM	12	0	2	20.40	18.15
					12	6	2	20.22	17.97
					12	11	2	20.25	18.00
					25	0	2	20.45	18.20



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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
				QPSK	1	0	0	22.07	19.82
					1	24	0	22.31	20.06
					1	49	0	22.22	19.97
					25	0	1	21.49	19.24
					25	12	1	21.41	19.16
					25	24	1	21.37	19.12
		26840	829.0		50	0	1	21.47	19.22
		20840	829.0		1	0	1	21.61	19.36
					1	24	1	21.59	19.34
					1	49	1	21.86	19.61
				16QAM	25	0	2	20.44	18.19
					25	12	2	20.37	18.12
					25	24	2	20.34	18.09
					50	0	2	20.57	18.32
					1	0	0	22.22	19.97
				QPSK	1	24	0	22.18	19.93
					1	49	0	22.14	19.89
					25	0	1	21.27	19.02
					25	12	1	21.21	18.96
					25	24	1	21.22	18.97
Daniel 20	1014	20015	92C F		50	0	1	21.23	18.98
Band 26	10M	26915	836.5	16QAM	1	0	1	21.73	19.48
					1	24	1	21.57	19.32
					1	49	1	21.46	19.21
					25	0	2	20.31	18.06
					25	12	2	20.27	18.02
					25	24	2	20.15	17.90
					50	0	2	20.24	17.99
					1	0	0	22.21	19.96
					1	24	0	22.22	19.97
					1	49	0	21.24	18.99
				QPSK	25	0	1	21.45	19.20
					25	12	1	21.23	18.98
					25	24	1	21.21	18.96
		26000	044.0		50	0	1	21.38	19.13
		26990	844.0		1	0	1	21.28	19.03
					1	24	1	21.48	19.23
					1	49	1	21.19	18.94
				16QAM		0	2	20.43	18.18
					25	12	2	20.25	18.00
					25	24	2	20.28	18.03
					50	0	2	20.48	18.23



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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
				QPSK	1	0	0	22.11	19.86
					1	37	0	22.35	20.10
					1	74	0	22.26	20.01
					36	0	1	21.53	19.28
					36	18	1	21.45	19.20
					36	35	1	21.41	19.16
		26865	831.5		75	0	1	21.51	19.26
		20803	851.5		1	0	1	21.65	19.40
					1	37	1	21.63	19.38
					1	74	1	21.90	19.65
				16QAM	36	0	2	20.48	18.23
					36	18	2	20.41	18.16
					36	35	2	20.38	18.13
					75	0	2	20.61	18.36
				QPSK	1	0	0	22.29	20.04
					1	37	0	22.25	20.00
					1	74	0	22.21	19.96
					36	0	1	21.34	19.09
			836.5		36	18	1	21.28	19.03
					36	35	1	21.29	19.04
Band 26	15M	26915			75	0	1	21.30	19.05
Dallu 20	12101	20913		16QAM	1	0	1	21.80	19.55
					1	37	1	21.64	19.39
					1	74	1	21.53	19.28
					36	0	2	20.38	18.13
					36	18	2	20.34	18.09
					36	35	2	20.22	17.97
					75	0	2	20.31	18.06
					1	0	0	22.29	20.04
					1	37	0	22.30	20.05
					1	74	0	21.32	19.07
				QPSK	36	0	1	21.53	19.28
					36	18	1	21.31	19.06
					36	35	1	21.29	19.04
		26965	0/1 E		75	0	1	21.46	19.21
		20905	841.5		1	0	1	21.36	19.11
					1	37	1	21.56	19.31
					1	74	1	21.27	19.02
				16QAM		0	2	20.51	18.26
					36	18	2	20.33	18.08
					36	35	2	20.36	18.11
					75	0	2	20.56	18.31



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### 8.2 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

#### <u>LIMIT</u>

According to FCC §2.1055, FCC §22.355.

Frequency Tolerance: +/- 2.5ppm

### **TEST PROCEDURE**

Use Anritsu 8820 with frequency Error measurement capability. Temp =  $-40^{\circ}$ C to  $+65^{\circ}$ C Voltage= 85% to 115% of the nominal value for AC powered equipment. **NOTE:** The frequency error was recorded frequency error from the communication simulator.

# **TEST RESULTS**

No non-compliance noted.



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# **Test Results**

# FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT: LTE Band 26 / QPSK

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)									
Limit: 2.5 ppm = 2091.25 Hz									
Power Supply (Vac)	Environment Temperature (°C)	BW: 10M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)					
12	65	0.02	0.000024						
12	50	0.01	0.000012						
12	40	0.00	0.000000						
12	30	0.01	0.000012						
12	20	0.00	0.000000						
12	10	0.01	0.000012	+/- 2.5					
12	0	-0.01	-0.000012						
12	-10	0.00	0.000000						
12	-20	-0.01	-0.000012						
12	-30	0.00	0.000000						
12	-40	0.01	0.000012						

#### LTE Band 26 / 16QAM

	Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)									
Limit: 2.5 ppm = 2091.25 Hz										
Power Supply (Vac)	Environment Temperature (°C)	BW: 10M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)						
12	65	0.03	0.000036							
12	50	0.02	0.000024							
12	40	0.01	0.000012							
12	30	0.01	0.000012							
12	20	0.00	0.000000							
12	10	0.01	0.000012	+/- 2.5						
12	0	0.02	0.000024							
12	-10	0.02	0.000024							
12	-20	-0.01	-0.000012							
12	-30	0.01	0.000012							
12	-40	0.00	0.000000							



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#### FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

#### LTE Band 26 / QPSK

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)									
Limit: 2.5 ppm = 2091.25 Hz									
Power Supply (Vac)	Environment Temperature (°C)	Frequency Error (ppm)	Limit (ppm)						
10.2		0.01	0.000012						
12	20	0.00	0.000000	+/- 2.5					
13.8		0.02	0.000024						

#### LTE Band 26 / 16QAM

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)									
	Limit: 2.5 ppm = 2091.25 Hz								
Power Supply (Vac)Environment Temperature (°C)BW: 20M Frequency Error(Hz)Frequency Error (ppm)									
10.2		0.02	0.000024						
12	20	0.00	0.000000	+/- 2.5					
13.8		0.03	0.000036						



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### 8.3 OCCUPIED BANDWIDTH MEASUREMENT

### **Limits**

For Reporting purposes only.

### **TEST PROCEDURES**

KDB 971168 D01

- 1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
- 2. RBW = 1-5% of the expected OBW
- 3. VBW  $\ge$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max. hold



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### LTE Band 26

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	OBW(99%)(MHz)	26 dB Bandwidth(MHz)
	1.4	Middle	QPSK	6	0	1.0941	1.2981
	1.4	Middle	16QAM	6	0	1.1027	1.3155
	3	Middle	QPSK	15	0	2.6831	2.9218
	5	Middle	16QAM	15	0	2.6831	2.9479
26	5	Middle	QPSK	25	0	4.4863	4.9590
20	5	Middle	16QAM	25	0	4.4718	4.8730
	10	Middle	QPSK	50	0	8.9436	9.7060
	10	Middle	16QAM	50	0	8.9146	9.6480
	45	Middle	QPSK	75	0	13.3719	14.6410
	15	Middle	16QAM	75	0	13.3719	14.5540



#### LTE Band 26 BW: 1.4MHz / QPSK / RB =6, RB Offset = 0 CH Mid

**T** Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 30 kHz 500 ms 👄 VBW 100 kHz 30 dB 👄 SWT Att Mode Auto Sweep ●1Pk View D3[1] 1.59 dB 1.29810 MHz 20 dBm-1.094066570 MHz D1 16.870 dBm-Τ1 M1[1] 16.87 dBm 10 dBm-836.86470 MHz 0 dBm M2 =D2 -9. 30 dBn -10 dBm--20 dBm-<mark>/20\_d8m</mark>∕ -40 dBm -50 dBm -60 dBm-F1 CF 836.5 MHz 691 pts Span 3.0 MHz Marker Type | Ref | Trc Function Function Result X-value Y-value 836.8647 MHz 16.87 dBm Μ1 1 T1 T2 1.09406657 MHz 835.95297 MHz 12.30 dBm 9.15 dBm Occ Bw 1 837.04703 MHz 1 M2 835.8488 MHz -10.12 dBm 1 M2 D3 1.2981 MHz 1.59 dB **E** 

#### Date: 20.DEC.2019 14:50:32

#### BW: 1.4MHz / 16QAM / RB =6, RB Offset = 0 CH Mid

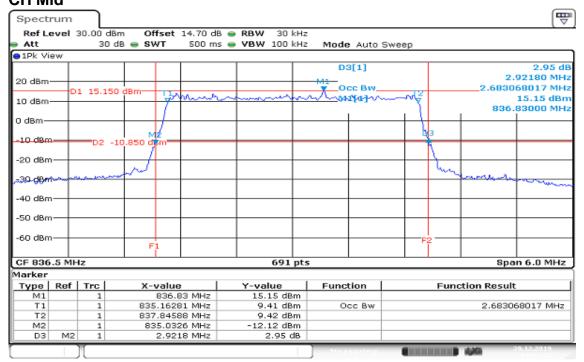
Spectrum										Ē
Ref Level	30.00 dB	m Offset	14.70 dB	RBW 30 k	Hz					
Att	30 d	B 👄 SWT	500 ms	🔵 VBW 100 k	Hz	Mode Auto	Sweep			
∋1Pk View										
			M1			D3[1]			1	1.72 d 31550 MH
20 dBm	1 16.470	dBm	×			Occ.Bw-				49638 MH
10 dBm			y and a		~	M1[1]	72		836	16.47 dBn 09620 MH
0 dBm				+ +			-+			
-10 d8m		.530 dBm								
-20 dBm										
-30-d8fh-^-	m	-							m	h
-40 dBm										<u> </u>
-50 dBm										
-60 dBm										
		F1					l ī			
CF 836.5 MI	-Iz			691	pts				Spa	n 3.0 MHz
larker										
	Trc	X-value		Y-value		Function		Fund	tion Resul	t
M1	1	836.096		16.47 dBr	m					-
T1	1	835.9442	28 MHz	7.98 dBr	m	Occ Bw			1.1027	49638 MHz
T2	1	837.0470	03 MHz	8.79 dBr	m					
M2	1	835.831	L4 MHz	-10.49 dBr	m					
D3 M2	1	1.315	55 MHz	1.72 d	в					
	J					Measuring.			4,00	20.12.2019

Date: 20.DEC.2019 14:49:15



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#### BW: 3MHz / QPSK / RB =15, RB Offset = 0 CH Mid



Date: 20.DEC.2019 14:52:23

#### BW: 3MHz / 16QAM / RB =15, RB Offset = 0 CH Mid

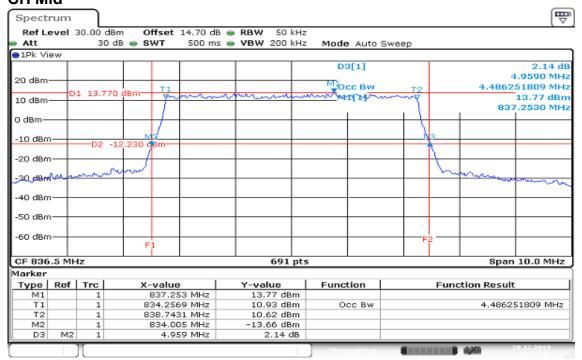
Spectrum								R
Ref Level	30.00 de	m Offset	14.70 dB (	RBW 30 kH	łz			
Att	30 (	dB 👄 SWT	500 ms (	VBW 100 kH	iz Mode Auto	Sweep		
∋1Pk View								
					D3[1]			2.62 d
20 dBm								2.94790 MH
				M1	Occ Bw			2.683068017 MH
10 dBm-	D1 12.99	0 dBm	حياقا انتلمت سمر	- Antarana	~~~	unal?		12.99 dBr
I		1 1/1		1 1				836.17870 MH
0 dBm				+ +				
-10 dBm				1 1		- K.,		
-10 dBm-	D2 -:	13.010 dam-						
-20 dBm								
				1 1			1	
-39 dBm-1-	and the second	www.		++			Contraction of the	mod and more mand
				1 1				and and
-40 dBm								
-50 dBm								
-50 abin				1 1				
-60 dBm								
I		F1		1 1		'ī		
CF 836.5 M	Hz			691 p	ts			Span 6.0 MHz
larker								
	Trc	X-value		Y-value	Function		Function	Result
M1	1	836.178	7 MHz	12.99 dBm				
T1	1	835.1628	1 MHz	8.80 dBm	Occ Bw			2.683068017 MHz
T2	1	837.8458		6.99 dBm				
M2	1	835.032		-14.51 dBm				
D3 M3	2 1	2.947	9 MHz	2.62 dB				
	1				Measuring.		100	20.12.2019

Date: 20.DEC.2019 14:54:00



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#### BW: 5MHz / QPSK / RB =25, RB Offset = 0 CH Mid



Date: 20.DEC.2019 14:56:43

#### BW: 5MHz / 16QAM / RB =25, RB Offset = 0 CH Mid

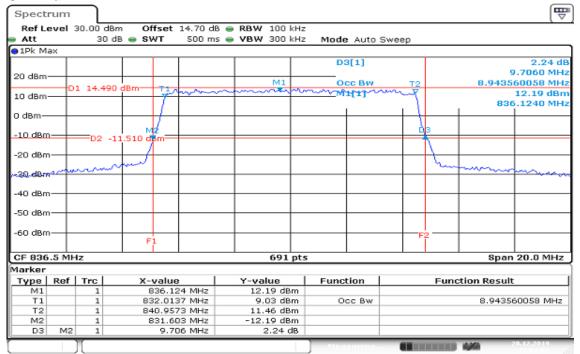
Spectrum										E
Ref Level 3	30.00 dBi	m Offset 14	.70 dB 👄	RBW 50 kH	iz					
Att	30 d	B 👄 SWT 5	600 ms 👄	VBW 200 kH	z Mode	Auto S	weep			
⊖1Pk View										
					DS	[1]				1.27 dE
20 dBm										4.8730 MH
	1 14.490	dem		MT1		C BW	т2		4.4717	780029 MH:
10 dBm	1 14.490	Long Long	00-0-A- &C	mendron	deman marine	للماجية	Firm			14.49 dBn
							Y		83	6.1240 MH
0 dBm										
		MZ					- L A	。		
-10 dBm	-D2 -1	1.510 d3m								
00 40								$\setminus$ 1		
-20 dBm										
-30. dBta	Anna	mm -						have		
1000 miles										mark
-40 dBm										
										1
-50 dBm										
										1
-60 dBm		F1					F	2		
		Î.								
CF 836.5 MH	z			691 p	ts				Spai	n 10.0 MHz
Marker										
Type Ref	Trc	X-value		Y-value	Funct	ion		Func	tion Resul	t
M1	1	836.124		14.49 dBm						
T1	1	834.2569 1		8.48 dBm		C Bw			4.4717	'80029 MHz
T2	1	838.7287		9.52 dBm						
M2	1	834.034 1		-12.09 dBm						
D3 M2	1	4.873	MHZ	1.27 dB						
					Mea	surina	STREET, STREET, STR		426	20.12.2019

Date: 20.DEC.2019 14:58:16



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#### BW: 10MHz / QPSK / RB =50, RB Offset = 0 CH Mid



Date: 20.DEC.2019 15:01:08

#### BW: 10MHz / 16QAM / RB =50, RB Offset = 0 CH Mid

Spectrum						l
Ref Level 30	).00 dBm	Offset 14.70	dB 👄 RBW 100 ki	-lz		
Att	30 dB 👄	SWT 500	ms 👄 <b>VBW</b> 300 ki	Iz Mode Auto S	Sweep	
1Pk View						
				D3[1]		1.08 di
20 d8m						9.6480 MH
				Occ Bw	M1 • T2	8.914616498 MH
10 d8m	14.230 dBm	Finner	mound	man Martal	Verhour ?	14.23 dBr
					1	840.2630 MH
0 dBm						I I I I I I I I I I I I I I I I I I I
					L L	
-10 dBm	-D2 -11.77				03	
	02 -11.77					
-20 dBm					- \	<u>                                      </u>
		1				
-30 dBm	mound	<i>s</i>			- WAR	massing marking
-40 dBm						
-40 abm						
-50 dBm						
-60 dBm						
		F1			1 1	
CF 836.5 MHz			691 p	ts		Span 20.0 MHz
Marker						
Type   Ref	Trc	X-value	Y-value	Function	Fund	ction Result
M1	1	840.263 MHz				
T1	1	832.0427 MHz	9.34 dBm	Occ Bw		8.914616498 MHz
T2	1	840.9573 MHz	10.53 dBm	1		
M2	1	831.661 MHz				
D3 M2	1	9.648 MHz	1.08 dB			
						20.12.2019

Date: 20.DEC.2019 15:02:11



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#### BW: 15MHz / QPSK / RB =75, RB Offset = 0 CH Mid

Spectrum										E
Ref Level	30.00	dBm Offset 1	4.70 dB (	BRBW 200 k	Hz					
Att	30	) dB 👄 SWT	500 ms (	<b>VBW</b> 1 M	Hz Mo	ode Auto S	Sweep			
∋1Pk View										
20 dBm				MI		D3[1]				-0.35 di 4.6410 MH
10 dBm	01 16.3	70 dBm 71	المريميني	mantenanna	المحمدي	QCG BW M1[1]	and 2			24747 MH 16.37 dBn 4.5030 MH
0 dBm		Ma								
-10 dBm	D2	-9.630 dBm					- 2	ί.		
-20 dBm	warne	mond						ture		
tool dom	10-3-0								mar and the second s	monteres
-40 dBm										
-50 dBm										
-60 dBm		F1					F	2		
CF 836.5 M	Hz			691 ;	ots				Span	30.0 MHz
Marker										
Type   Ref	Trc	X-value		Y-value	Fu	nction		Fund	tion Result	
M1	1	834.503		16.37 dBr						
T1	1	829.814		11.72 dBr		Occ Bw			13.3719	24747 MHz
T2	1	843.186		10.93 dBr						
M2	1	829.143		-11.26 dBr						
D3 M2	2 1	14.641	. MHz	-0.35 di	3					
	Л					te a surin g			4,40	20.12.2019

Date: 20.DEC.2019 15:09:35

#### BW: 15MHz / 16QAM / RB =75, RB Offset = 0 CH Mid

Spectr	um												E
Ref Le	vel 3	30.00	iBm O	ffset	14.70 d	B 👄 RBW	200 kHz	:					
Att		30	i dB 👄 S1	wт	500 m	s 👄 VBW	/ 1 MH2	Mode	a Auto S	Sweep			
⊖1Pk Vie	эw												
20 dBm-					M				3[1]				1.35 dB 4.5540 MHz
10 dBm-	D:	1 14.9	30 dBm	7	min	in m	~~~~~		cc Bw_ 1[1]	T2			24747 MHz 14.93 dBm 2.3760 MHz
0 dBm—	-+			$\downarrow$						$\rightarrow$			+
-10 dBm	_	—D2	-11.070 d								3		
-20 dBm	+			<u> </u>		_					$\Lambda$		
-38-dBm		phan	mar	-							he	man	howner
-40 dBm	+			_									
-50 dBm	+		_	-		_							
-60 dBm	+		-	1		_					F2		
				i i									
CF 836	.5 MH	lz					691 pt	5			· · · · ·	Spar	1 30.0 MHz
Marker													
Туре	Ref	Trc	X-	value		Y-Ve	alue	Func	tion		Fun	ction Resul	t
M1		1	8	832.3	76 MHz	14	.93 dBm						
T1		1			14 MHz		.51 dBm	0	cc Bw			13.3719	24747 MHz
T2		1	8	843.18	36 MHz		.82 dBm						
M2		1	8		36 MHz		.38 dBm						
D3	M2	1		14.55	54 MHz		1.35 dB						
								Mea	suring			4,49	20.12.2019

Date: 20.DEC.2019 15:08:21



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# 8.4 PEAK TO AVERAGE POWER RATIO

### <u>Limit</u>

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

### **Test Procedures**

- 1. According to KDB 971168 D01,
- 2. The EUT was connect to spectrum analyzer and call box.
- 3. Set the CCDF function in spectrum analyzer.
- 4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
- 5. Record the Peak to Average Power Ratio.

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.



4MHz/QPSK/1RB									
FREQUENCY	PEAK TO AVERAGE RATIO (dB)								
	4.41								
	4.41								
	PEAK TO AVERAGE RATIO								
(MHz)	(dB)								
836.5	5.10								
/IHz / QPSK / 1RB									
FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
836.5	4.32								
/Hz / 16QAM / 1RB									
FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
836.5	5.13								
CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB									
FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
836.5	4.55								
/Hz / 16QAM / 1RB									
FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
836.5	5.59								
MHz/OPSK/1RB	0.00								
FREQUENCY	PEAK TO AVERAGE RATIO								
(MHz)	(dB)								
836.5	4.55								
MHz / 16QAM / 1RB									
	PEAK TO AVERAGE RATIO								
	(dB)								
	5.48								
	PEAK TO AVERAGE RATIO								
(MHz)	(dB)								
836.5	4.72								
MHz/16QAM/1RB									
FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
836.5	5.68								
	FREQUENCY (MHz)         836.5         4MHz / 16QAM / 1RB         FREQUENCY (MHz)         836.5         ////////////////////////////////////								

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.



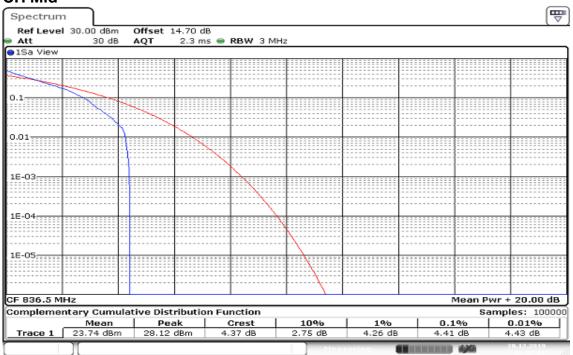
<b>CHANNEL BANDWIDTH: 1.</b>	4MHz / QPSK / Full RB									
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.07								
CHANNEL BANDWIDTH: 1.	4MHz / 16QAM / Full RB									
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.91								
CHANNEL BANDWIDTH: 3MHz / QPSK / Full RB										
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	4.90								
CHANNEL BANDWIDTH: 3M										
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.94								
CHANNEL BANDWIDTH: 5M										
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	4.87								
CHANNEL BANDWIDTH: 5M										
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.91								
<b>CHANNEL BANDWIDTH: 10</b>	MHz / QPSK / Full RB									
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	4.93								
<b>CHANNEL BANDWIDTH: 10</b>										
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.94								
<b>CHANNEL BANDWIDTH: 15</b>	MHz / QPSK / Full RB									
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	5.22								
<b>CHANNEL BANDWIDTH: 15</b>	MHz / 16QAM / Full RB									
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)								
26915	836.5	6.12								

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.



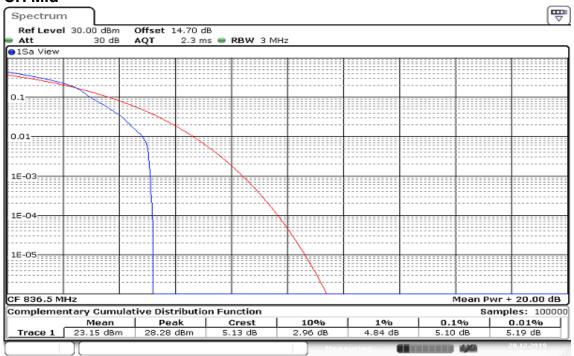
Page: 34 / 93 Rev.: 02

#### LTE Band 26 BW: 1.4MHz / QPSK / RB =1, RB Offset = 0 CH Mid



Date: 20.DEC.2019 16:02:07

#### BW: 1.4MHz / 16QAM / RB =1, RB Offset = 0 CH Mid

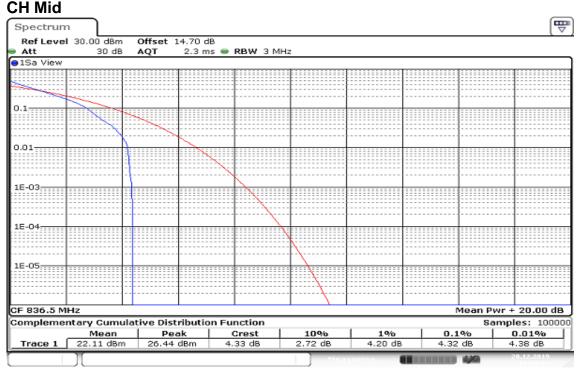


Date: 20.DEC.2019 16:02:30



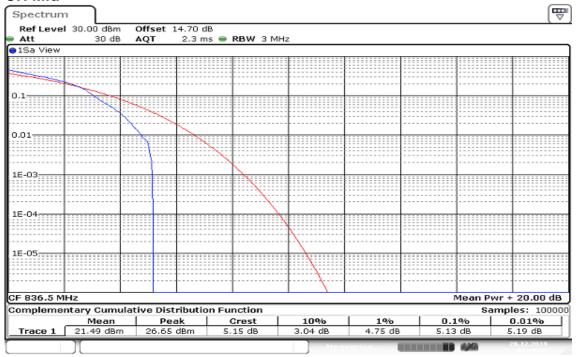
Page: 35 / 93 Rev.: 02

# BW: 3MHz / QPSK / RB =1, RB Offset = 0



Date: 20.DEC.2019 16:10:04

#### BW: 3MHz / 16QAM / RB =1, RB Offset = 0 CH Mid

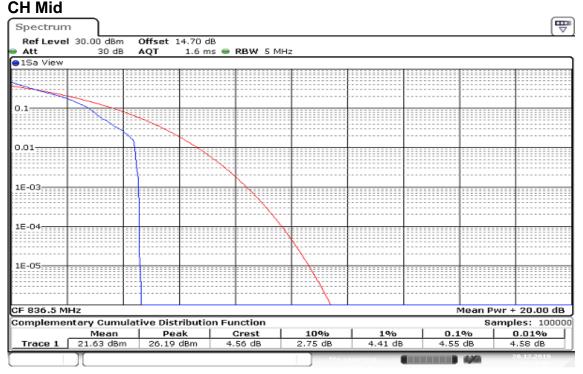


Date: 20.DEC.2019 16:09:26



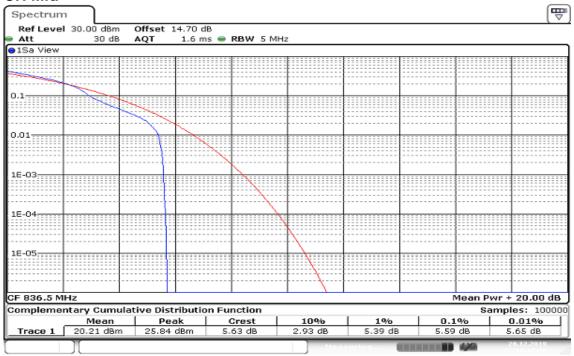
Page: 36 / 93 Rev.: 02

# BW: 5MHz / QPSK / RB =1, RB Offset = 0



Date: 20.DEC.2019 16:13:07

#### BW: 5MHz / 16QAM / RB =1, RB Offset = 0 CH Mid

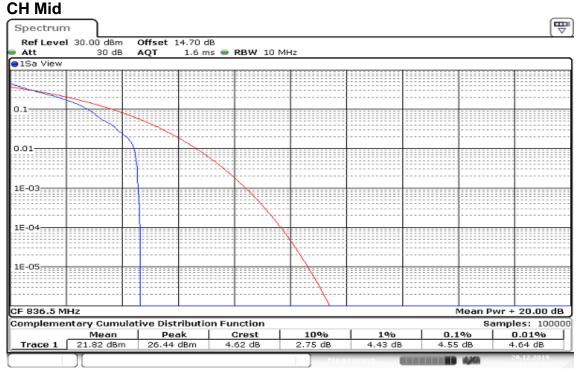


Date: 20.DEC.2019 16:12:41



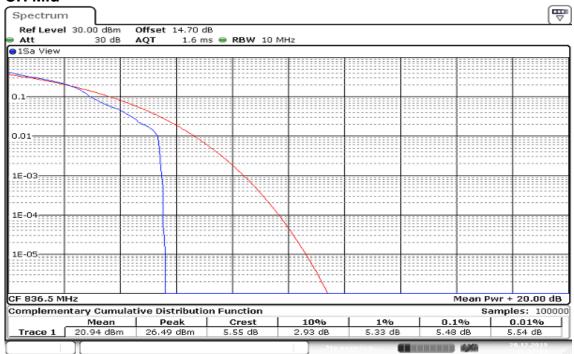
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# BW: 10MHz / QPSK /RB =1, RB Offset = 0



Date: 20.DEC.2019 16:16:52

#### BW: 10MHz / 16QAM /RB =1, RB Offset = 0 CH Mid

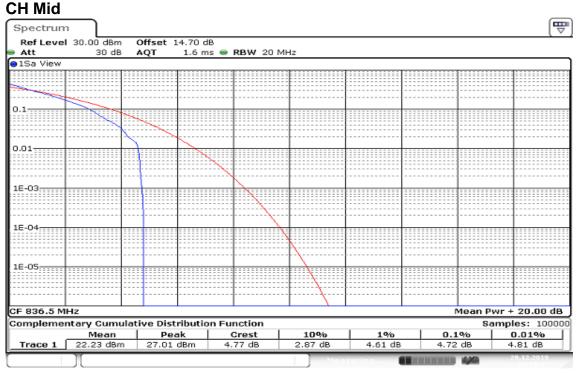


Date: 20.DEC.2019 16:17:14



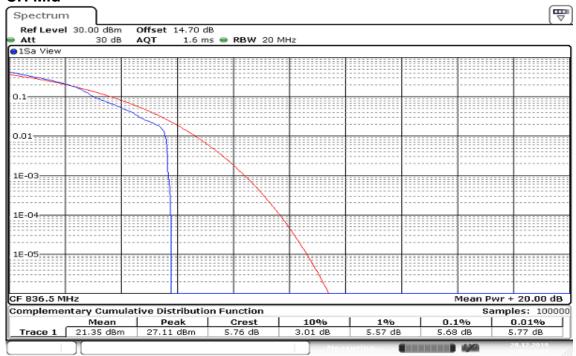
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# BW: 15MHz / QPSK /RB =1, RB Offset = 0



#### Date: 20.DEC.2019 16:19:17

#### BW: 15MHz / 16QAM /RB =1, RB Offset = 0 CH Mid

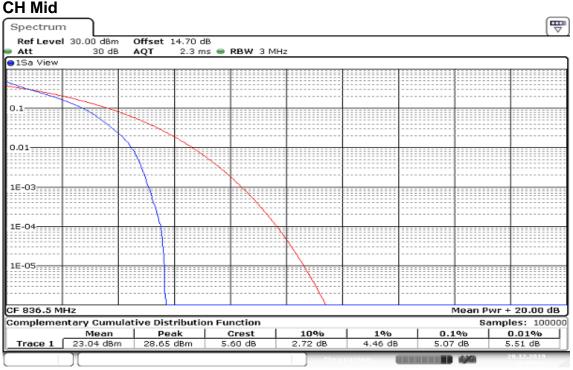


Date: 20.DEC.2019 16:18:51



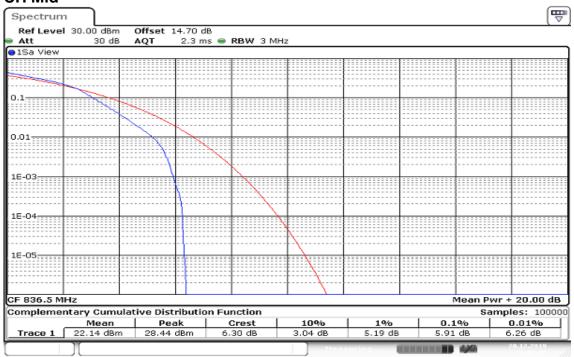
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# BW: 1.4MHz / QPSK / RB =Full, RB Offset = 0



Date: 20.DEC.2019 16:00:27

### BW: 1.4MHz / 16QAM / RB =Full, RB Offset = 0 CH Mid

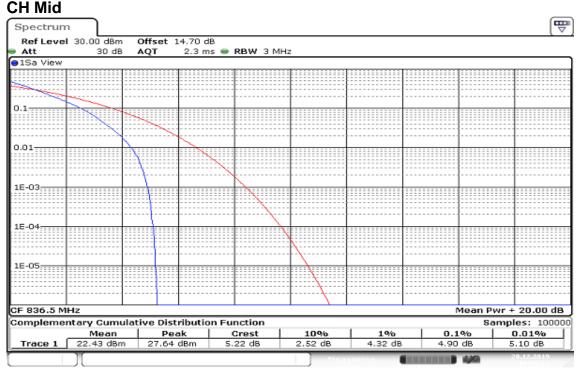


Date: 20.DEC.2019 16:02:49



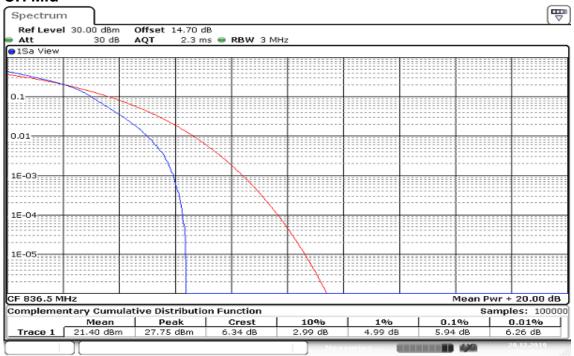
Page: 40 / 93 Rev.: 02

# BW: 3MHz / QPSK / RB =Full, RB Offset = 0



Date: 20.DEC.2019 16:10:23

### BW: 3MHz / 16QAM / RB =Full, RB Offset = 0 CH Mid

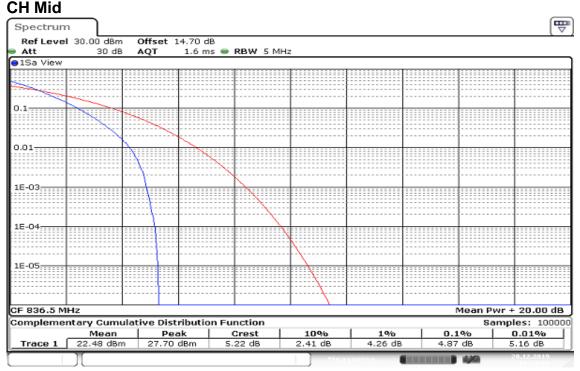


Date: 20.DEC.2019 16:10:43



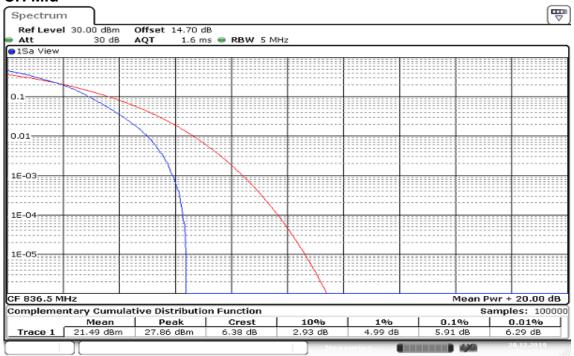
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# BW: 5MHz / QPSK / RB =Full, RB Offset = 0



Date: 20.DEC.2019 16:13:37

### BW: 5MHz / 16QAM / RB =Full, RB Offset = 0 CH Mid

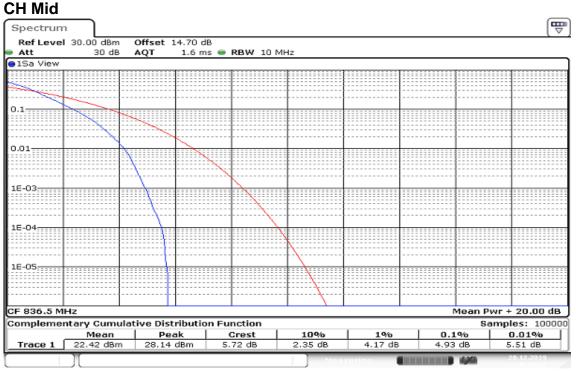


Date: 20.DEC.2019 16:12:10



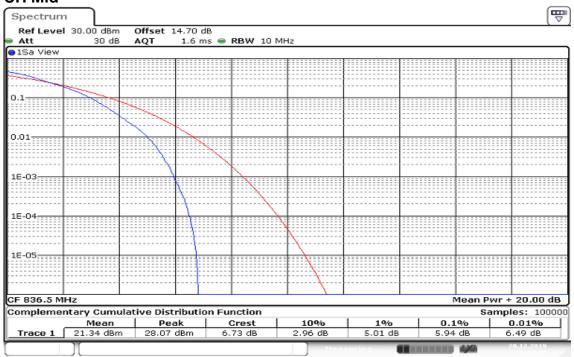
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# BW: 10MHz / QPSK /RB =Full, RB Offset = 0



Date: 20.DEC.2019 16:16:28

### BW: 10MHz / 16QAM /RB =Full, RB Offset = 0 CH Mid



Date: 20.DEC.2019 16:14:48



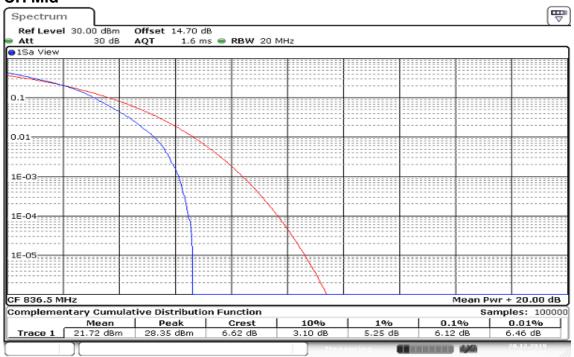
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# BW: 15MHz / QPSK /RB =Full, RB Offset = 0



Date: 20.DEC.2019 16:18:02

### BW: 15MHz / 16QAM /RB =Full, RB Offset = 0 CH Mid



Date: 20.DEC.2019 16:18:27



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# 8.5 CONDUCTED BAND EDGE MEASUREMENT

# <u>Limit</u>

# FCC §22.917(a), Band 5

For operations in the 824-849 MHz band, Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P) dB$ .

# **Test Procedures**

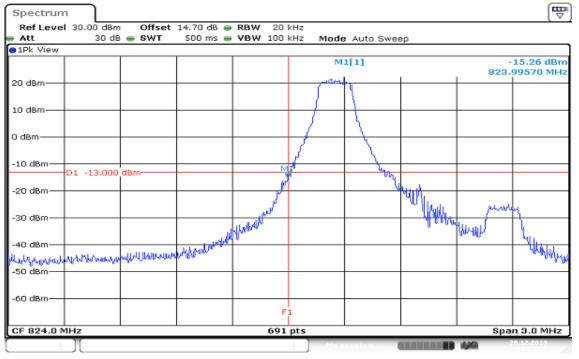
KDB 971168 D01,

- 1. RBW  $\geq$  1% of the emission bandwidth
- 2. VBW  $\geq$  3 x RBW
- 3. Span was set large enough so as to capture all out of emissions near the band edge.



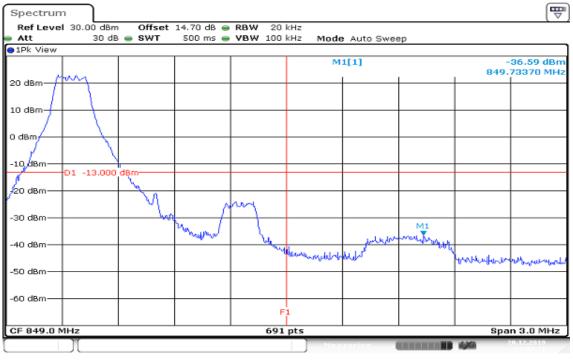
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# Test Results: LTE Band 26 CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 13:58:25

#### **HIGHER BAND EDGE**





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### Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB ALLOCATED

T Spectrum Ref Level 30.00 dBm Offset 14.70 dB 
RBW 20 kHz Att 30 dB 👄 SWT 500 ms 👄 VBW 100 kHz Mode Auto Sweep 😑 1Pk View M1[1] -15.26 dBm 823.98700 MHz 20 dBm-10 dBm-0 dBm--10 dBm-¢, D1 -13.000 dBm MM Maller Marken M Marken Ma -20 dBm--30 dBm-All the underfurned on the opening 40 dBm www.manulauthereader -50 dBm -60 dBm-F1 CF 824.0 MHz 691 pts Span 3.0 MHz

Date: 20.DEC.2019 13:59:19

#### **HIGHER BAND EDGE** ÷ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 20 kHz 500 ms 👄 VBW 100 kHz Att 30 dB 👄 SWT Mode Auto Sweep 😑 1 Pk View M1[1] -37.50 dBm 849.60780 MHz 20 dBm 10 dBm 0 dBm -10 dBm-D1 -13.000 dBm -💋 dBm -30 dBm -lagerest 1 -40 dBmmulunally الرول under Angliangh -50 dBm· -60 dBm-FI Span 3.0 MHz CF 849.0 MHz 691 pts

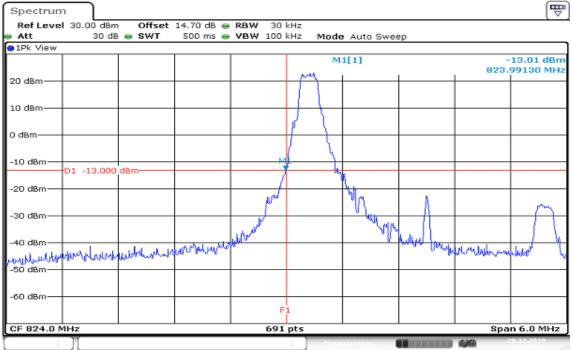
Date: 20.DEC.2019 14:01:46



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### Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:08:40

#### **HIGHER BAND EDGE** ÷ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 30 kHz 500 ms 👄 VBW 100 kHz Att 30 dB 👄 SWT Mode Auto Sweep 😑 1 Pk View M1[1] -37.09 dBm 849.98120 MHz 20 dBit 1p dB d dBm -10 dBm-01 -13,000 dBm -20 dBm--30 dBm м1 -40 dBm-المام الملها والمراجا المحاصر Mondol -50 dBm--60 dBm-FI Span 6.0 MHz CF 849.0 MHz 691 pts

Date: 20.DEC.2019 14:07:30



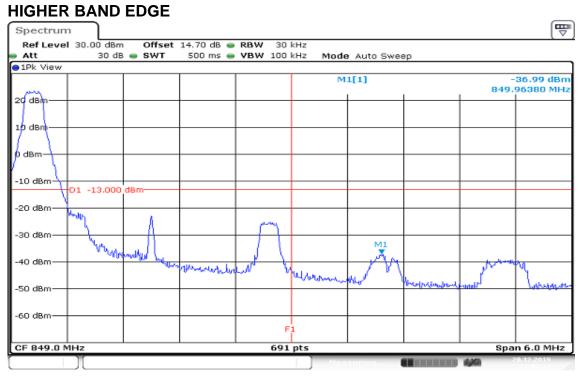
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## Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE

T Spectrum Ref Level 30.00 dBm Offset 14.70 dB @ RBW 30 kHz Att 30 dB 👄 SWT 500 ms 👄 VBW 100 kHz Mode Auto Sweep 😑 1Pk View M1[1] -13.35 dBm 823.99130 MHz 20 dBm-10 dBm-0 dBm--10 dBm-D1 -13.000 dBm -20 dBm-Ń -30 dBm-ካሆ! ١Ý 40 dBm Von Juppy and way whenter لتركعكم رالية ويهدا المرايد -50 dBm--60 dBm-F1 CF 824.0 MHz 691 pts Span 6.0 MHz

Date: 20.DEC.2019 14:09:03



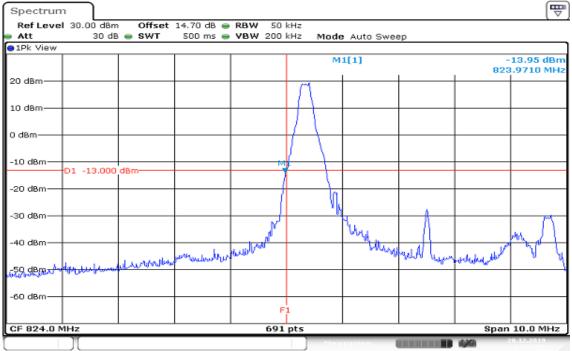
Date: 20.DEC.2019 14:06:15



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## Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:17:57

#### **HIGHER BAND EDGE** ÷ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 50 kHz 500 ms 👄 VBW 200 kHz Att 30 dB 👄 SWT Mode Auto Sweep 😑 1 Pk View M1[1] -36.20 dBm 852.7920 MHz 20 dBm 10 dBm 0 dBm -10 dBm -D1 -13.000 dBm--20 dBm -30 dBm M1 År 44, -40 dBm--50 dBm--60 dBm-FI Span 10.0 MHz CF 849.0 MHz 691 pts

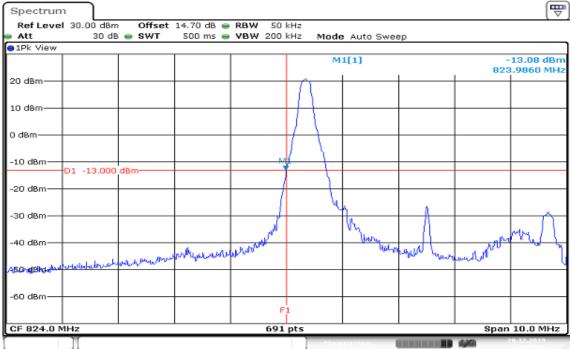
Date: 20.DEC.2019 14:16:57



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## Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:18:43

#### **HIGHER BAND EDGE** ÷ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 50 kHz 500 ms 👄 VBW 200 kHz Att 30 dB 👄 SWT Mode Auto Sweep 😑 1 Pk View M1[1] -36.76 dBm 852.9220 MHz 20 dBm 10 dBm d dBm -10 dBm -D1 -13.000 dBm--20 dBm -30 dBm М JAA. -40 dBmun mound -50 dBm--60 dBm-F1 Span 10.0 MHz CF 849.0 MHz 691 pts

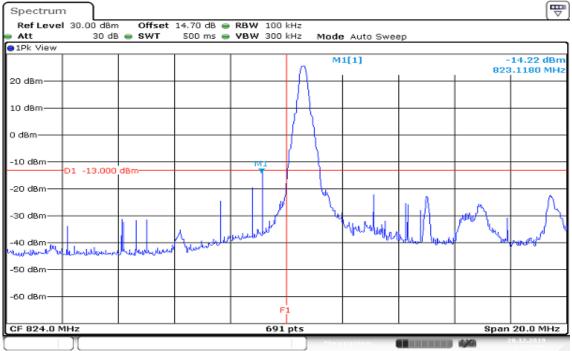
Date: 20.DEC.2019 14:16:17



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### Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:24:05

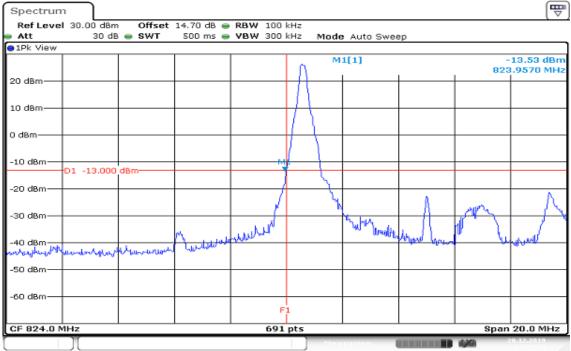
#### **HIGHER BAND EDGE B** Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 100 kHz 500 ms 👄 VBW 300 kHz Att 30 dB 👄 SWT Mode Auto Sweep 😑 1 Pk View M1[1] -35.07 dBm 849.0580 MHz 20 dBm 10 dBm 🗴 dBr -10 dBm D1 -13.000 dBm--20 dBm -30 dBm marchen -40 dBm-للمتعالم والمعان montality maruhan worknow the second -50 dBm--60 dBm-FI Span 20.0 MHz CF 849.0 MHz 691 pts Date: 20.DEC.2019 14:25:03



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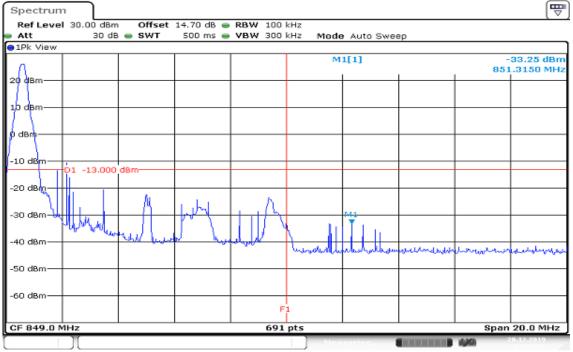
### Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:23:11

# HIGHER BAND EDGE



Date: 20.DEC.2019 14:27:14

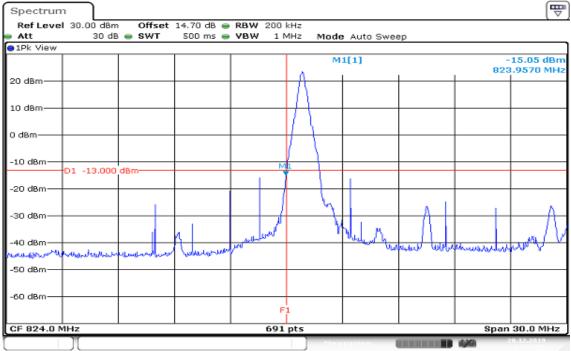


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÷

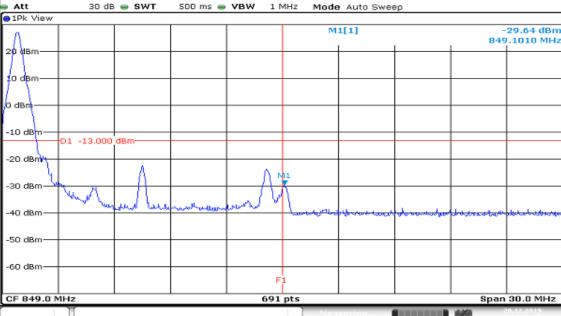
## Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:41:56

#### **HIGHER BAND EDGE** Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 200 kHz Att 30 dB 👄 SWT 500 ms 👄 VBW 1 MHz 😑 1 Pk View



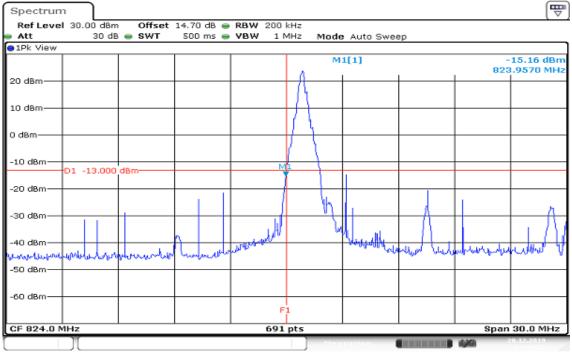
Date: 20.DEC.2019 14:39:26



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### Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:41:28

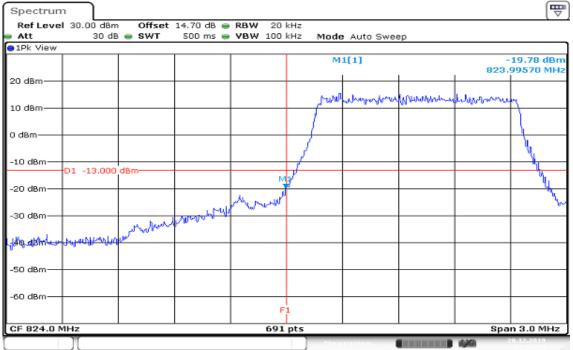
#### **HIGHER BAND EDGE** ÷ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 200 kHz Att 30 dB 👄 SWT 500 ms 👄 VBW 1 MHz Mode Auto Sweep 😑 1 Pk View M1[1] -28.65 dBm 849.0140 MHz 20 dBm 10 dBm 0 dBm -10 dBm D1 -13.000 dBm--20 dBm -30 dBm No -40 dBm--50 dBm--60 dBm-F1 Span 30.0 MHz CF 849.0 MHz 691 pts Date: 20.DEC.2019 14:40:10



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 1.4MHz / QPSK / Full RB ALLOCATED



Date: 20.DEC.2019 13:57:51

#### **HIGHER BAND EDGE**

Ref Level 30.00 dBm		14.70 dB 👄		20 kHz				
Att 30 dB 🖷	SWT	500 ms 👄	<b>VBW</b> 10	DO kHz Mo	de Auto Swe	ер		
1Pk View								
					M1[1]			18.36 dBr 00430 MH
20 d8m				_				
mount	when	man	M					
10 dBm								
0 dBm								
-10 dBm								
01 -13.000 de	lm			1				
-20 dBm				mugrow	manyare.			
-30 dBm						houltwat	and a course	wither many
-40 dBm				_	_			
-50 dBm								
-60 dBm				_	_			
				F1				
CF 849.0 MHz			6	91 pts			Spa	n 3.0 MHz

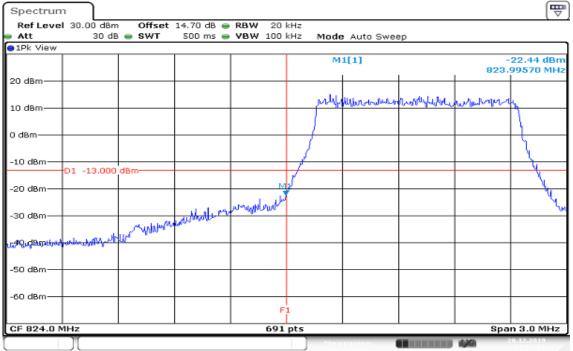
Date: 20.DEC.2019 14:03:01



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 1.4MHz / 16QAM / Full RB ALLOCATED



Date: 20.DEC.2019 13:57:04

#### **HIGHER BAND EDGE**

Spectrum			( <del>"</del>
Ref Level 30.00 dBm Offset 14.70 dB  RBV			
Att 30 dB  SWT 500 ms  VBV	V 100 kHz Mode	e Auto Sweep	
1Pk View			
	M	1[1]	-17.59 dBr
			849.00430 MH
0 dBm			
Mannenmannen			
0 dBm /			
I dBm			
10 dBm 01 -13.000 dBm			
	WI L		
20 <sup>′</sup> dBm			
	Mar.		
30 dBm	Wyyuu	monelly was to	
		and water of	Approved by the
40 dBm			upper make the patient whereas
40 UBIII			
50 dBm			
60 dBm			
	F1		
CF 849.0 MHz	691 pts		Span 3.0 MHz

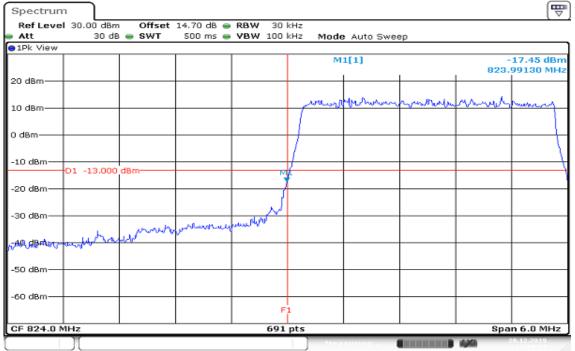
Date: 20.DEC.2019 14:03:45



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 3MHz / QPSK / Full RB ALLOCATED



Date: 20.DEC.2019 14:09:58

#### **HIGHER BAND EDGE**

Ref Level 3			14.70 dB 🧉						
Att	30 dB	e swt	500 ms 🦷	VBW 100	kHz Mode	Auto Swee	ep		
1Pk View					M	L[1]			15.33 dBr 00440 MH
20 dBm									
10/dBm	mm	mm	how	manin					
dBm									
-10 dBm									
	-13.000	dBm		N N	1				
-30 dBm					anound .	andre n			
							Whender	www.w	when
-40 dBm									
50 dBm									
60 dBm				F					
CF 849.0 MH				691					n 6.0 MHz

Date: 20.DEC.2019 14:05:41



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 3MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE

**T** Spectrum Ref Level 30.00 dBm Offset 14.70 dB 👄 RBW 30 kHz 500 ms 👄 VBW 100 kHz Att 30 dB 👄 SWT Mode Auto Sweep ●1Pk View M1[1] -17.48 dBm 823.99130 MHz 20 dBm-MR an 10 dBm-0 dBm--10 dBm-D1 -13.000 dBm -20 dBm--30 dBmmarch Mer burger MO -40-dBm₩ -50 dBm--60 dBm-F1 CF 824.0 MHz 691 pts Span 6.0 MHz

Date: 20.DEC.2019 14:09:32

#### **HIGHER BAND EDGE**

Spectrum								<b>T</b>
Ref Level 30.00 dBm		14.70 dB 👄						
	IWS 🖷	500 ms 👄	VBW 100	Hz Mode	Auto Swee	ep		
●1Pk View				M	1[1]			16.02 dBm )0440 MHz
20 dBm								
10/08m-01-01	manad		Manny					
0 dBm								
10 dBm 01 -13.000	dBm			1				
-20 dBm								
-40 dBm				- Carline	Mrshrownya	winter	mum	Mederaway
-50 dBm								
-60 dBm								
CF 849.0 MHz			F 691				Spa	n 6.0 MHz
				Mea	suring		4/6	0.12.2019

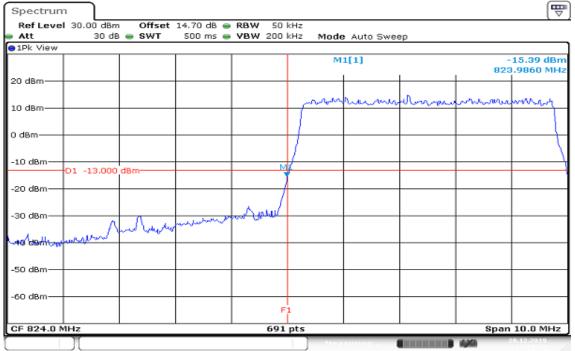
Date: 20.DEC.2019 14:05:05



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 5MHz / QPSK / Full RB ALLOCATED



Date: 20.DEC.2019 14:19:42

#### **HIGHER BAND EDGE**

Ref Level	30.00 dBm	Offset	14.70 dB 🧉	RBW 50	kHz				
Att	30 dB	swt 😑 s	500 ms 🦷	VBW 200	kHz Mode	Auto Swee	эp		
1Pk View									
					M	1[1]			-14.69 dBr 9.0100 MH
20 dBm									+
	nousente	when	want	may					
dBm									
10 dBm-					1				
-20 dBm-	D1 -13.000	d8m		1					
30 dBm					Mundre of	<del>www.du</del> o	4		
						4.10.0000	Mr. Charlen Str	Month	hours
40 dBm									Mu
50 dBm									
60 dBm									
				F	Ĩ				
CF 849.0 M	IHZ			691	pts			Span	10.0 MHz

Date: 20.DEC.2019 14:15:02



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 5MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE

ඐ Spectrum Ref Level 30.00 dBm Offset 14.70 dB 
RBW 50 kHz 500 ms 👄 VBW 200 kHz Att 30 dB 👄 SWT Mode Auto Sweep ●1Pk View M1[1] -14.97 dBm 823.9860 MHz 20 dBm-10 dBm-أواله 0 dBm--10 dBm-D1 -13.000 dBm -20 dBm--30 dBmwhyte reduction se republications Amager pt -50 dBm--60 dBm-F1 CF 824.0 MHz 691 pts Span 10.0 MHz

Date: 20.DEC.2019 14:19:16

#### **HIGHER BAND EDGE**

Spectrum				
Ref Level 30.00 dBm				
	🛯 👄 SWT 🛛 500 ms	VBW 200 kHz Mode	e Auto Sweep	
●1Pk View				
		M	11[1]	-17.45 dBm 849.0100 MHz
20 dBm				
10/del Martin	mounder marger	~~~~		
0,d8m				
10 dBm-01 -13.000	dBm			
-20 dBm				
-30 dBm		Jacourose	. nd d.	
-40 dBm			mannahan	housedware
-50 dBm				
-60 dBm				
CF 849.0 MHz		691 pts		Span 10.0 MHz
		Mea	osuring	20.12.2010

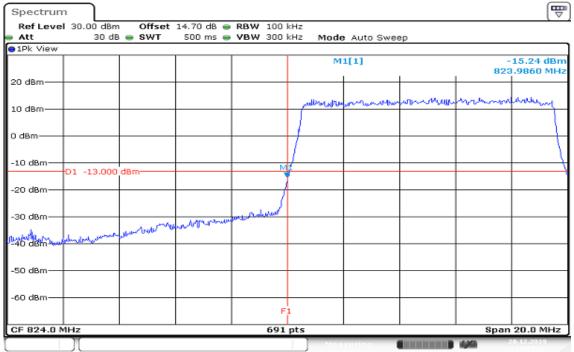
Date: 20.DEC.2019 14:15:32



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 10MHz / QPSK / Full RB ALLOCATED



Date: 20.DEC.2019 14:21:22

#### **HIGHER BAND EDGE**

Ref Level 3	30.00 dBm	Offset	14.70 dB	RBW	100	kHz				
Att	30 dB	👄 SWT	500 ms	vbw	300	kHz Mode	e Auto Swee	ep		
1Pk View										
						м	1[1]			-17.78 dBr 0.1000 MH
20 dBm										
10/d8m	ruhundu	mm	manu	work	4					
10 dBm	1 -13.000	d0m			- \					
-20 dBm	1 -13.000	dem				M1				
-30 dBm						Month and	hortenation	um		
-40 dBm				-				Mary	antermontant	unnun
-50 dBm										
.60 dBm										
					F	1				
CF 849.0 MH	iz		•		691	pts			Span	20.0 MHz

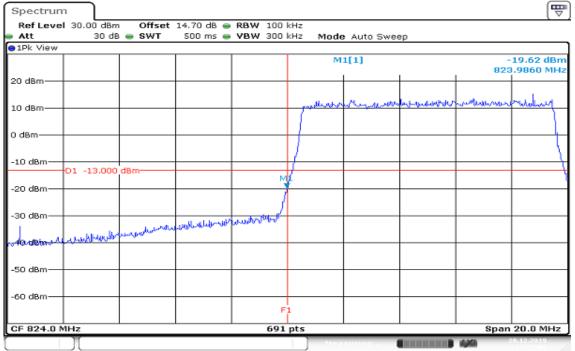
Date: 20.DEC.2019 14:25:45



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 10MHz / 16QAM / Full RB ALLOCATED



Date: 20.DEC.2019 14:22:01

#### **HIGHER BAND EDGE**

Spectrum Ref Level 30.00 dBm Offset	14.70 dB 👄 RBW 100 l		l
Att 30 dB = SWT	500 ms - VBW 300 l		20
1Pk View	300 ms - +BW 300 m	IN A MODE AUTO SWEE	eh
		M1[1]	-20.39 dt 849.0290 M
20 dBm			
19 demander and	many		
0 d8m			
01 -13.000 d8m		1	
-20 dBm			
-40 dBm		and marked mark where	Anter and a state of the second state of the s
-50 dBm			
-60 dBm			
CF 849.0 MHz	691		Span 20.0 MF

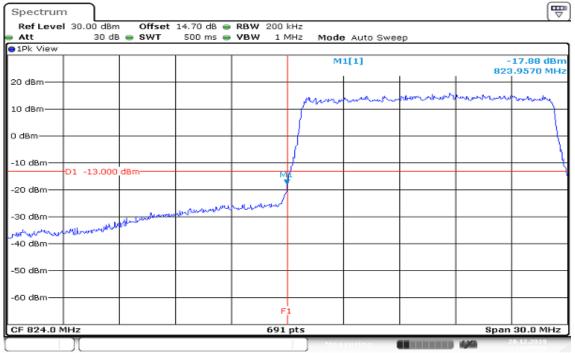
Date: 20.DEC.2019 14:26:21



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 15MHz / QPSK / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:45:20

#### **HIGHER BAND EDGE**

Spectrum							[₩
Ref Level 30.00		14.70 dB  RBW 20					
Att 3	30 dB 🥃 SWT	500 ms 👄 VBW	1 MHz Mod	e Auto Swee	ер		
DIPK VIEW							
			M	11[1]			15.07 dBr
20 dBm				1		045	.0140 MH
mount	mannen	mound					
10 dBm							
1							
0 <sup>r</sup> dBm				<u> </u>			
			1				
-10 dBm			N1				
D1 -13	000 dBm		1				
-20 dBm							
			Land				
-30 dBm			Lowman	-			
-30 08/11				and the second	andahim		
				Jamelly	andarin	when haven	he
-40 dBm							- Archine
-50 dBm				+			
-60 dBm			_				
			F1				
05.040.0 MU			01			0	00.0 M
CF 849.0 MHz		6	91 pts			span	30.0 MHz

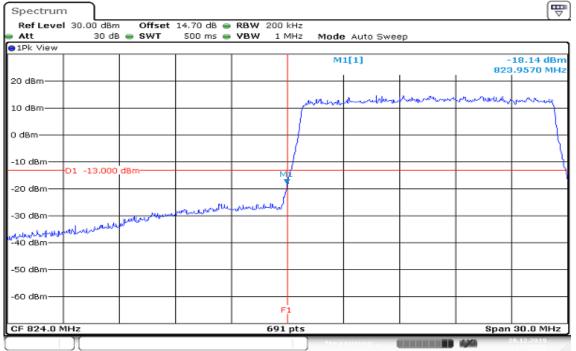
Date: 20.DEC.2019 14:38:46



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# Report No.: T191120D05-RP11

# CHANNEL BANDWIDTH: 15MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:45:55

#### **HIGHER BAND EDGE**

Ref Level       30.00 dBm       Offset       14.70 dB       RBW       200 kHz         Att       30 dB       SWT       500 ms       VBW       1 MHz       Mode       Auto Sweep         1Pk View       M1[1]       -18.23 dB       849.0140 Mi         20 dBm       M1[1]       -18.23 dB       849.0140 Mi         10 dBm       Mail       Mail       Mail       Mail       Mail       Mail         10 dBm       Mail       Mail       Mail       Mail       Mail       Mail       Mail       Mail         20 dBm       Mail       Mail       Mail       Mail       Mail       Mail       Mail       Mail         20 dBm       Mail       <	Spectrum									(₩
1Pk View     M1[1]     -18.23 dB       20 dBm     10 dBm     10 dBm     10 dBm       10 dBm     0     10 dBm     10 dBm       -20 dBm     0     10 dBm     10 dBm       -20 dBm     0     0     0       -30 dBm     0     0     0       -50 dBm     0     0     0										
20 dBm     M1[1]     -18.23 dB       10 dBm     10 dBm     10 dBm     10 dBm       10 dBm     10 dBm     10 dBm       -20 dBm     11 dBm     11 dBm       -20 dBm     11 dBm     11 dBm       -20 dBm     11 dBm     11 dBm       -30 dBm     11 dBm     11 dBm       -40 dBm     11 dBm     11 dBm       -50 dBm     11 dBm     11 dBm		30 dB	swt 😑 S	500 ms 👄	VBW 1	MHz Mode	Auto Swee	ep		
20 dBm 10 dBm	∋1Pk View									
10       dBm       dB						м	1[1]			
0 dBm	20 dBm									
10 dBm     01 -13.000 dBm     11     10     10       -20 dBm     11     10     10     10       -30 dBm     10     10     10     10       -50 dBm     10     10     10     10	19'dBm	Martana est	Minuter and	man	manag					
-20 dBm										
-20 dBm	10 dBm									
-30 dBm		01 -13.000	dBm		ķ	<b>(</b> 1				
-50 dBm						housever				
-50 dBm							When the same	mathematic	a delander of	M.1 1.
-50 dBm	-40 dBm									ليشبيك يتفصهمني
-60 d8m	-50 dBm									
	-60 dBm									
F1						Í.				
CF 849.0 MHz 691 pts Span 30.0 MH	CF 849.0 M	Hz			691	pts				30.0 MHz

Date: 20.DEC.2019 14:38:00