

FCC Radio Test Report

FCC ID: 2AH4HMT4201

This report concerns: Original Grant

Project No. : 2104C020
Equipment : LTE Cat-M1 Tracker
Brand Name : Mobilogix
Test Model : MT4201E
Series Model : MT4201C
Applicant : Mobilogix, Inc.
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Manufacturer : Mobilogix, Inc.
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Factory : Suga Electronics (Dongguan) Co., Ltd.
Address : No.8 Fulong Road, Qingxi Town, Dongguan City
Date of Receipt : Apr. 28, 2021
Date of Test : Apr. 29, 2021 ~ May 18, 2021
Issued Date : Jun. 07, 2021
Report Version : R00
Test Sample : Engineering Sample No.: DG2021050858
Standard(s) : 47 CFR FCC Part 24 Subpart E
47 CFR FCC Part 2
ANSI/TIA/EIA-603-E-2016
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Vegeta Li

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jun. 07, 2021

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 24 Subpart E & Part 2			
Standard(s) Section	Test Item	Judgment	Remark
2.1046 24.232(c)	Equivalent Isotropic Radiated Power	PASS	-----
2.1049	Occupied Bandwidth	PASS	-----
2.1051 24.238(a)	Conducted Spurious Emissions	PASS	-----
2.1053 24.238(a)	Radiated Spurious Emissions	PASS	-----
24.238(a)	Band Edge Measurements	PASS	-----
24.232(d)	Peak To Average Ratio	PASS	-----
2.1055 24.235	Frequency Stability	PASS	-----

Note:

(1) "N/A" denotes test is not applicable in this test report.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

BTL's Test Firm Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

The BTL measurement uncertainty as below table:

A. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	4.58
		6GHz ~ 18GHz	5.18

B. Other Measurement:

Parameter	Uncertainty
Spectrum Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Power Spectral Density	±0.86 dB
Frequency Stability	±0.16 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	21.3°C	46%	DC 3.7	Tate Liu
Occupied Bandwidth	21.3°C	46%	DC 3.7	Tate Liu
Conducted Spurious Emissions	21.3°C	46%	DC 3.7	Tate Liu
Radiated Spurious Emissions	26°C	52%	DC 3.7	Grani Zhou
Band Edge	21.3°C	46%	DC 3.7	Tate Liu
Peak to Average Ratio	21.3°C	46%	DC 3.7	Tate Liu
Frequency Stability	Normal & Extreme	46%	Normal & Extreme	Tate Liu

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	LTE Cat-M1 Tracker			
Brand Name	Mobilogix			
Test Model	MT4201E			
Series Model	MT4201C			
Model Difference(s)	Only differ in model name and Harness.			
Hardware Version	1.2			
Software Version	1.5.0.1			
Power Source	1# DC voltage supplied from external power supply. 2# Supplied from battery.			
Power Rating	1# DC 48V 2# DC 3.7V			
IEMI No.	864475040048497			
LTE Category	M1			
Modulation Type	GSM		GMSK	
	EDGE/GPRS		GMSK, 8PSK	
	LTE		UL: QPSK,16QAM DL: QPSK,16QAM	
Max. EIRP	GSM 1900 / GPRS 1900		GMSK	26.02 dBm
	EDGE 1900		8PSK	22.46 dBm
	LTE	Channel Bandwidth (MHz)	QPSK (dBm)	16QAM (dBm)
	Band 2	1.4	18.01	17.15
		3	18.01	17.22
		5	17.92	18.29
		10	18.18	18.49
		15	16.91	17.10
		20	17.93	18.27

Note:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

PCS 1900				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	512	1850.2	528	1930.2
Mid Range	661	1880	677	1960
High Range	810	1909.8	826	1989.8

LTE Band 2					
Test Frequency ID	Bandwidth (MHz)	N _{UL}	Frequency of Uplink (MHz)	N _{DL}	Frequency of Downlink (MHz)
Low Range	1.4	18607	1850.7	607	1930.7
	3	18615	1851.5	615	1931.5
	5	18625	1852.5	625	1932.5
	10	18650	1855	650	1935
	15	18675	1857.5	675	1937.5
	20	18700	1860	700	1940
Mid Range	1.4/3/5/10/15/20	18900	1880	900	1960
High Range	1.4	19193	1909.3	1193	1989.3
	3	19185	1908.5	1185	1988.5
	5	19175	1907.5	1175	1987.5
	10	19150	1905	1150	1985
	15	19125	1902.5	1125	1982.5
	20	19100	1900	1100	1980

3. Table for Filed Antenna:

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	Internal	N/A	-2.65	PCS 1900
N/A	N/A	Internal	N/A	-2.65	LTE Band 2

Note: The antenna gain is provided by the manufacturer.

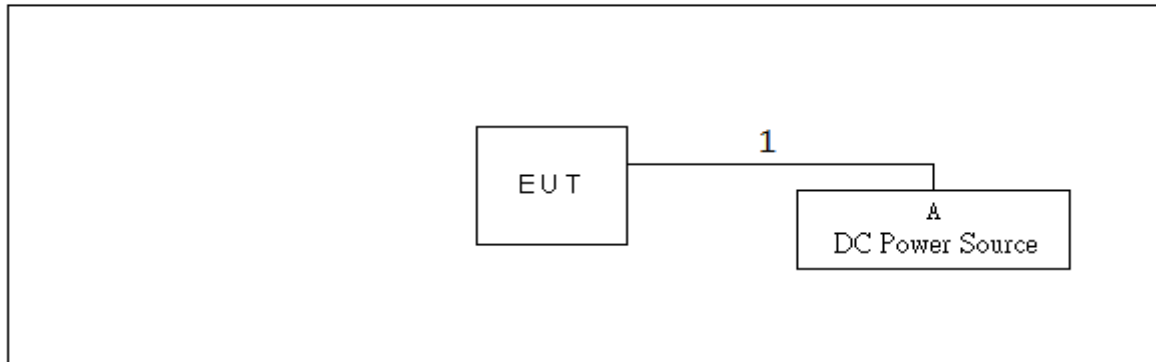
2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & EIRP	512 to 810	512, 661, 810	GSM, GPRS, EDGE
Occupied Bandwidth	512 to 810	512, 661, 810	GSM, EDGE
Conducted Spurious Emissions	512 to 810	661	GSM, EDGE
Radiated Spurious Emissions	512 to 810	661	GSM
Band Edge	512 to 810	512, 810	GSM, EDGE
Peak to Average Ratio	512 to 810	512, 661, 810	GSM, EDGE
Frequency Stability	512 to 810	661	GSM

LTE BAND 2 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1RB/6RB
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1RB/6RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1RB/6RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1RB/4RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1RB/6RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1RB/6RB
Occupied Bandwidth	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	6RB
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	6RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	6RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	6RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	6RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	6RB
Conducted Spurious Emissions	18607 to 19193	18900	1.4 MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB
Radiated Spurious Emissions	18607 to 19193	18900	1.4 MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB
Band Edge	18607 to 19193	18607, 19193	1.4MHz	QPSK	1RB/6RB
	18615 to 19185	18615, 19185	3MHz	QPSK	1RB/6RB
	18625 to 19175	18625, 19175	5MHz	QPSK	1RB/6RB
	18650 to 19150	18650, 19150	10MHz	QPSK	1RB/6RB
	18675 to 19125	18675, 19125	15MHz	QPSK	1RB/6RB
	18700 to 19100	18700, 19100	20MHz	QPSK	1RB/6RB
Peak To Average Ratio	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1RB
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1RB
Frequency Stability	18607 to 19193	18900	1.4MHz	QPSK	1RB
	18615 to 19185	18900	3MHz	QPSK	1RB
	18625 to 19175	18900	5MHz	QPSK	1RB
	18650 to 19150	18900	10MHz	QPSK	1RB
	18675 to 19125	18900	15MHz	QPSK	1RB
	18700 to 19100	18900	20MHz	QPSK	1RB

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	DC Power Source	TRUE-POWER	GPC30300N	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Mobile / Portable station are limited to 2 watts e.i.r.p.

3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

EIRP:

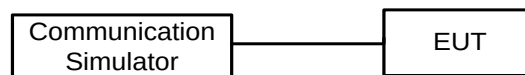
$EIRP = \text{Output Power} + \text{Antenan gain}$

Output Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP LAYOUT

Output Power Measurement



3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

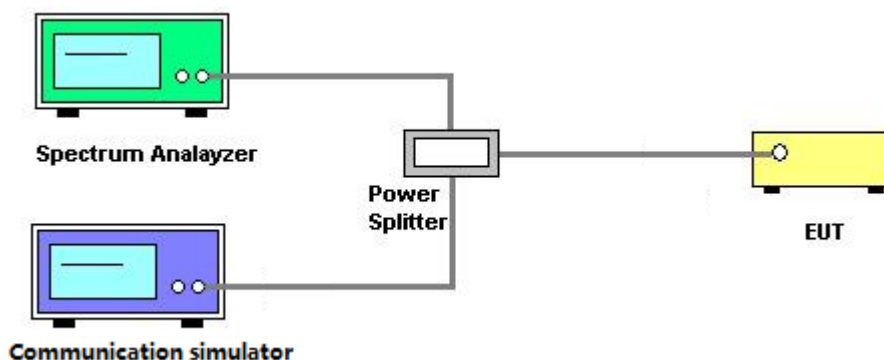
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.

1. The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. $RBW = (1\% \sim 5\%) \cdot EBW$
 $VBW \geq 3 \cdot RBW$
4. Set spectrum analyzer with Peak detector.

3.2.2 TEST SETUP LAYOUT



3.2.3 TEST DEVIATION

No deviation

3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

3.3.1 LIMIT

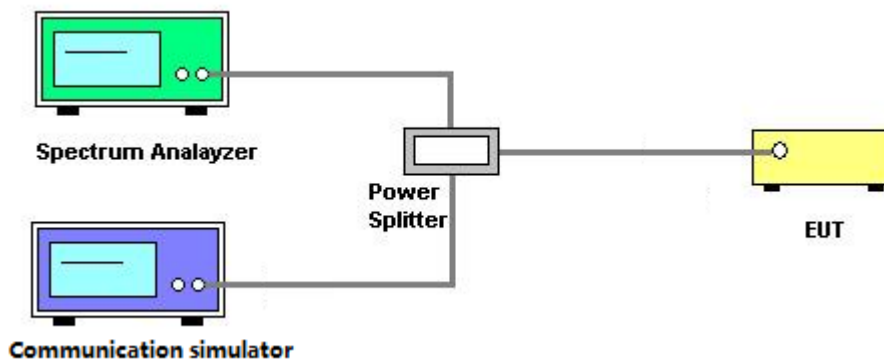
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with Peak detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.3.3 TEST SETUP LAYOUT



3.3.4 TEST DEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

3.4.1 LIMIT

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. The emission limit equal to -13dBm.

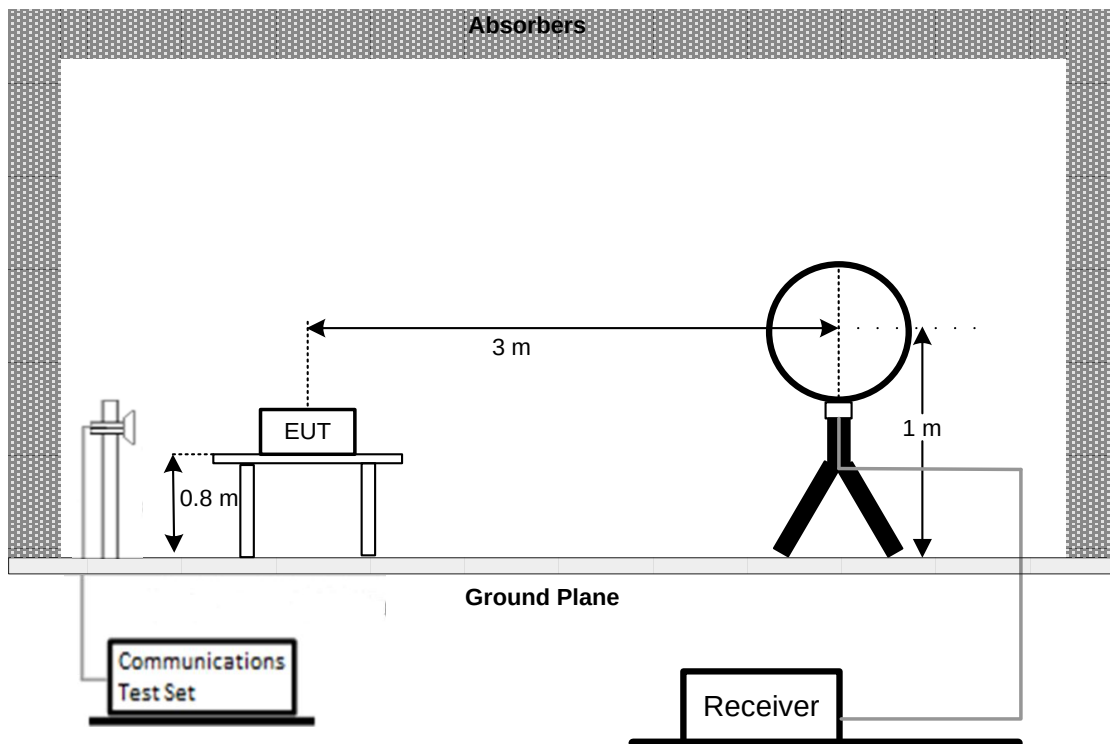
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.2.

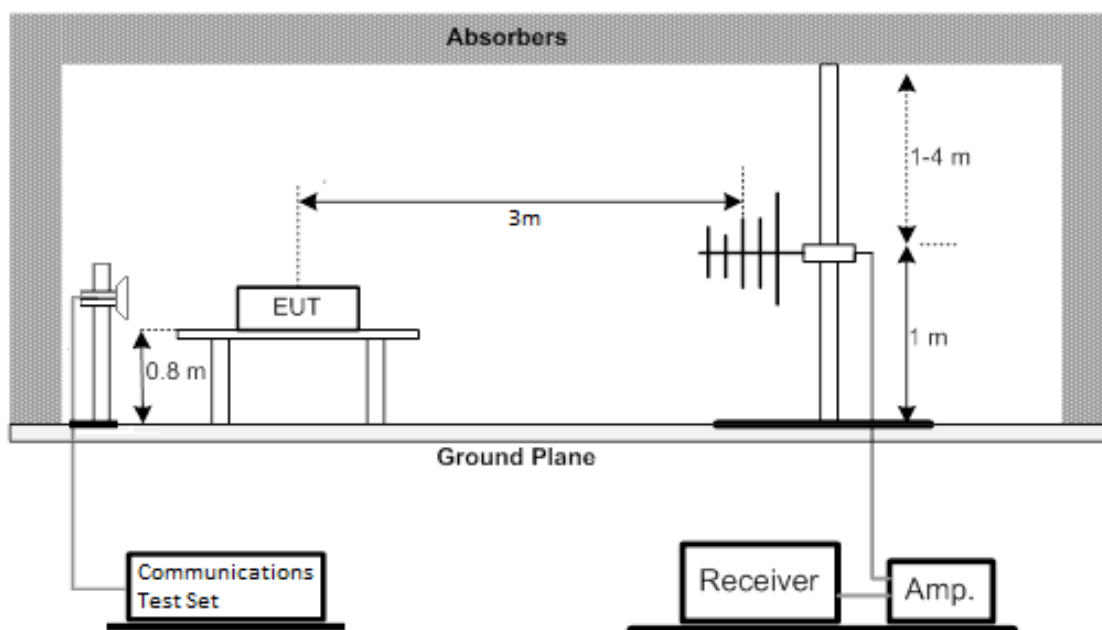
1. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
3. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
4. ERP can be calculated form EIRP by subtracting the gain of dipole, $ERP = EIPR - 2.15\text{dBi}.$
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

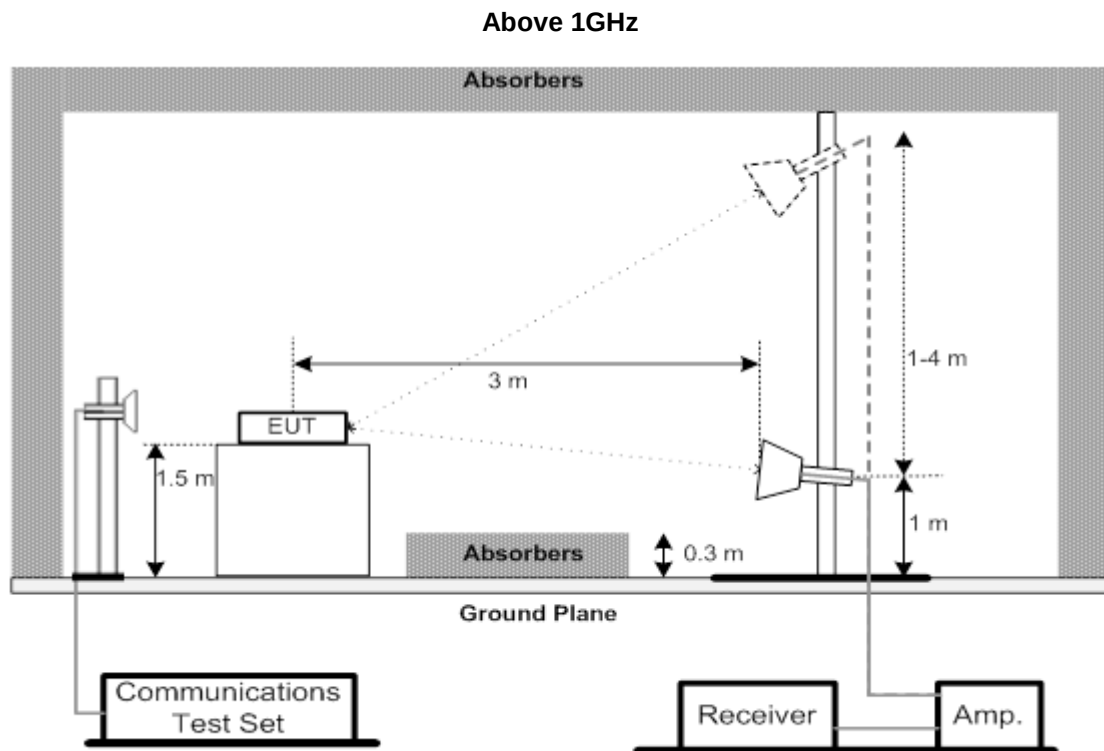
3.4.3 TEST SETUP LAYOUT

Below 30MHz



30MHz to 1000MHz





3.4.4 TEST DEVIATION

No deviation

3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

3.5 BAND EDGE MEASUREMENT

3.5.1 LIMIT

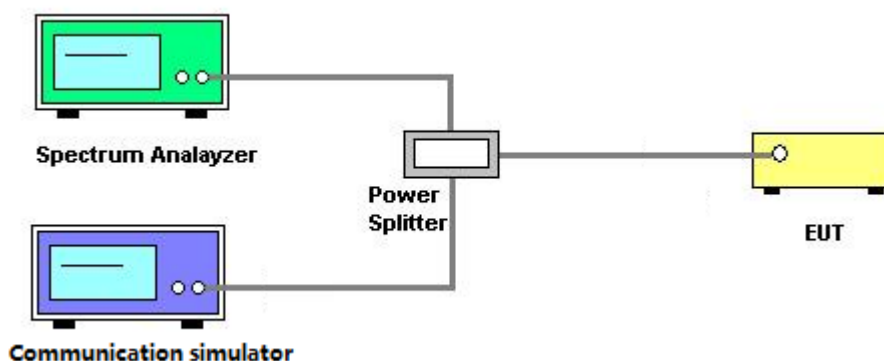
A Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. Record the max trace plot into the test report.

3.5.3 TEST SETUP LAYOUT



3.5.4 TEST DEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

3.6 PEAK TO AVERAGE RATIO MEASUREMENT

3.6.1 LIMIT

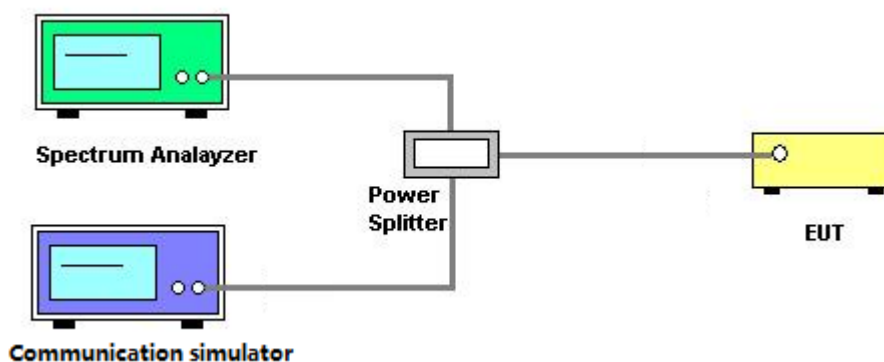
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

1. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.6.3 TEST SETUP LAYOUT



3.6.4 TEST DEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

3.7 FREQUENCY STABILITY MEASUREMENT

3.7.1 LIMIT

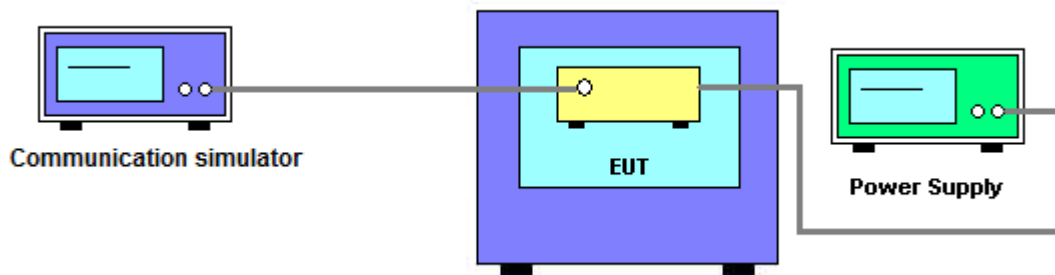
± 1.5 ppm is for base and fixed station. ± 2.5 ppm is for mobile station.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

3.7.3 TEST SETUP LAYOUT



3.7.4 TEST DEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 15, 2022
2	Amplifier	Agilent	8449B	3008A02334	Feb. 27, 2022
3	HighPass Filter	Wairwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Feb. 27, 2022
4	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/ 12SS	38	Feb. 27, 2022
5	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Feb. 27, 2022
6	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Feb. 27, 2022
7	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/ 10SS	17	Feb. 27, 2022
8	HighPass Filter	Wairwright Instruments Gmbh	WHK3.1/18G-10SS	24	Feb. 27, 2022
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
11	Receiver	Agilent	N9038A	MY52130039	Jul. 25, 2021
12	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 07, 2022
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 07, 2022
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 07, 2022
16	Cable	emci	LMR-400(30MHz-1GHz) (8m+5m)	N/A	May 23, 2021
17	Cable	mitron	B10-01-01-12M	18072744	Jun. 28, 2021
18	Controller	ETS-Lindgren	2090	N/A	N/A
19	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
20	Loop Antenna	EM	EM-6876-1	230	Apr. 28, 2022
21	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 17, 2022
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jul. 07, 2021

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Feb. 28, 2022
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2*	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
5	Const Temp,& Humidity Chamber	Bell	BTH-50C	20170306001	Feb. 27, 2022

Remark: "N/A" denotes no model name, serial no. or calibration specified.

"*" calibration period of equipment list is three year.

Except * item, all calibration period of equipment list is one year.

APPENDIX A - OUTPUT POWER

Output Power (dBm):

PCS1900		512CH	661CH	810CH
		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		28.67	27.99	28.26
GPRS/EDGE (GMSK)	1 Tx Slot	28.61	27.81	28.16
	2 Tx Slot	27.54	27.12	26.94
	3 Tx Slot	24.74	25.17	24.07
	4 Tx Slot	23.95	23.15	23.22
EDGE (8PSK)	1 Tx Slot	25.11	24.14	24.42
	2 Tx Slot	24.24	23.44	23.17
	3 Tx Slot	22.57	21.80	21.37
	4 Tx Slot	20.57	20.84	20.55

LTE Band / BW	Channel / Frequency (MHz)	RB Size	RB Offset	Index	Conducted Power (dBm)	
					QPSK	16QAM
2 / 1.4M	18607 / 1850.7	1	0	0	20.64	19.80
		6	0	0	19.55	18.54
	18900 / 1880	1	0	0	20.54	19.74
		6	0	0	19.40	18.50
	19193 / 1909.3	1	5	0	20.66	19.77
		6	0	0	19.70	18.75
2 / 3M	18615 / 1851.5	1	0	0	20.66	19.59
		6	0	0	19.52	18.50
	18900 / 1880	1	0	0	20.58	19.51
		6	0	0	19.37	18.45
	19185 / 1908.5	1	5	1	20.54	19.87
		6	0	1	19.49	18.67
2 / 5M	18625 / 1852.5	1	0	0	20.57	20.94
		6	0	0	19.55	19.66
	18900 / 1880	1	0	0	20.57	20.87
		6	0	0	19.41	19.63
	19175 / 1907.5	1	5	0	20.53	20.87
		6	0	3	19.59	19.82
2 / 10M	18650 / 1855	1	0	3	20.68	21.14
		4	0	0	20.75	20.96
	18900 / 1880	1	0	0	20.52	20.72
		4	0	0	20.50	20.76
	19150 / 1905	1	5	4	20.63	20.95
		4	2	7	20.83	20.92
2 / 15M	18675 / 1857.5	1	0	3	19.55	19.75
		6	0	0	19.48	19.60
	18900 / 1880	1	0	0	19.53	19.75
		6	0	0	19.46	19.62
	19125 / 1902.5	1	5	8	19.35	19.56
		6	0	11	19.56	19.62
2 / 20M	18700 / 1860	1	0	3	20.57	20.92
		6	0	0	20.54	20.72
	18900 / 1880	1	0	0	20.49	20.80
		6	0	0	20.50	20.69
	19100 / 1900	1	5	12	20.44	20.72
		6	0	15	20.58	20.78

EIRP (dBm):

PCS1900		512CH	661CH	810CH
		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		26.02	25.34	25.61
GPRS/EDGE (GMSK)	1 Tx Slot	25.96	25.16	25.51
	2 Tx Slot	24.89	24.47	24.29
	3 Tx Slot	22.09	22.52	21.42
	4 Tx Slot	21.30	20.50	20.57
EDGE (8PSK)	1 Tx Slot	22.46	21.49	21.77
	2 Tx Slot	21.59	20.79	20.52
	3 Tx Slot	19.92	19.15	18.72
	4 Tx Slot	17.92	18.19	17.90

LTE Band / BW	Channel / Frequency (MHz)	RB Size	RB Offset	Index	Conducted Power (dBm)	
					QPSK	16QAM
2 / 1.4M	18607 / 1850.7	1	0	0	17.99	17.15
		6	0	0	16.90	15.89
	18900 / 1880	1	0	0	17.89	17.09
		6	0	0	16.75	15.85
	19193 / 1909.3	1	5	0	18.01	17.12
		6	0	0	17.05	16.10
2 / 3M	18615 / 1851.5	1	0	0	18.01	16.94
		6	0	0	16.87	15.85
	18900 / 1880	1	0	0	17.93	16.86
		6	0	0	16.72	15.80
	19185 / 1908.5	1	5	1	17.89	17.22
		6	0	1	16.84	16.02
2 / 5M	18625 / 1852.5	1	0	0	17.92	18.29
		6	0	0	16.90	17.01
	18900 / 1880	1	0	0	17.92	18.22
		6	0	0	16.76	16.98
	19175 / 1907.5	1	5	0	17.88	18.22
		6	0	3	16.94	17.17
2 / 10M	18650 / 1855	1	0	3	18.03	18.49
		4	0	0	18.10	18.31
	18900 / 1880	1	0	0	17.87	18.07
		4	0	0	17.85	18.11
	19150 / 1905	1	5	4	17.98	18.30
		4	2	7	18.18	18.27
2 / 15M	18675 / 1857.5	1	0	3	16.90	17.10
		6	0	0	16.83	16.95
	18900 / 1880	1	0	0	16.88	17.10
		6	0	0	16.81	16.97
	19125 / 1902.5	1	5	8	16.70	16.91
		6	0	11	16.91	16.97
2 / 20M	18700 / 1860	1	0	3	17.92	18.27
		6	0	0	17.89	18.07
	18900 / 1880	1	0	0	17.84	18.15
		6	0	0	17.85	18.04
	19100 / 1900	1	5	12	17.79	18.07
		6	0	15	17.93	18.13

APPENDIX B - OCCUPIED BANDWIDTH

PCS1900					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
512	1850.2	0.2419	512	1850.2	0.2433
661	1880	0.2375	661	1880	0.2408
810	1909.8	0.2391	810	1909.8	0.2466
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
512	1850.2	0.3051	512	1850.2	0.3129
661	1880	0.3025	661	1880	0.3098
810	1909.8	0.3003	810	1909.8	0.3076

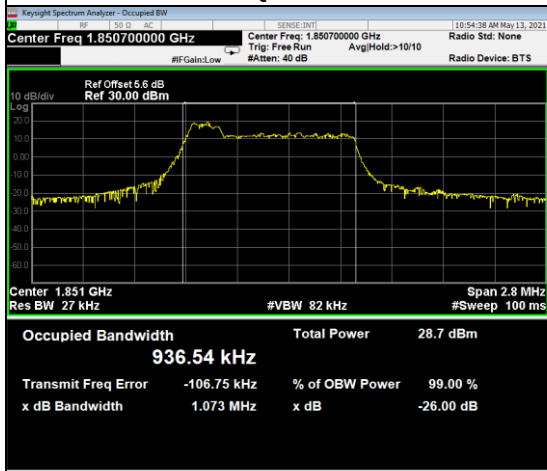
Spectrum Plot



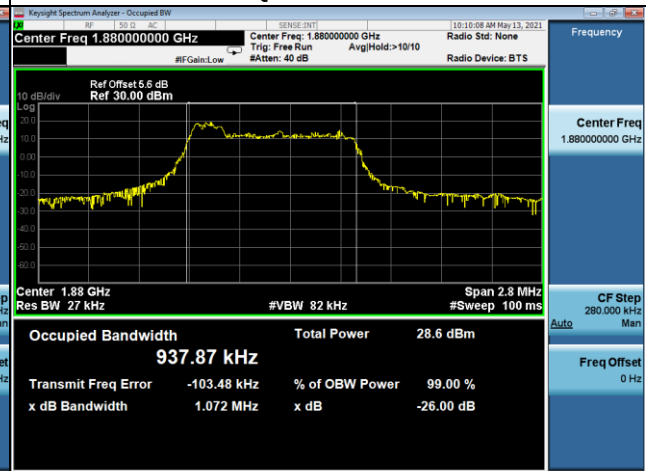
LTE Band 2_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18607	1850.7	0.9365	18607	1850.7	1.073
18900	1880	0.9379	18900	1880	1.072
19193	1909.3	0.9361	19193	1909.3	1.070
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18607	1850.7	1.1155	18607	1850.7	1.277
18900	1880	1.1097	18900	1880	1.279
19193	1909.3	1.1179	19193	1909.3	1.276

Spectrum Plot

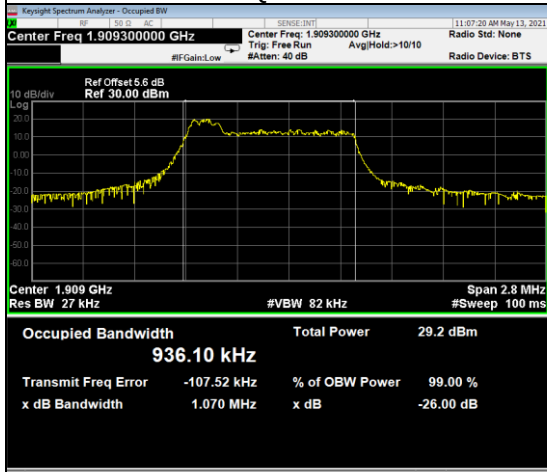
QPSK-18607



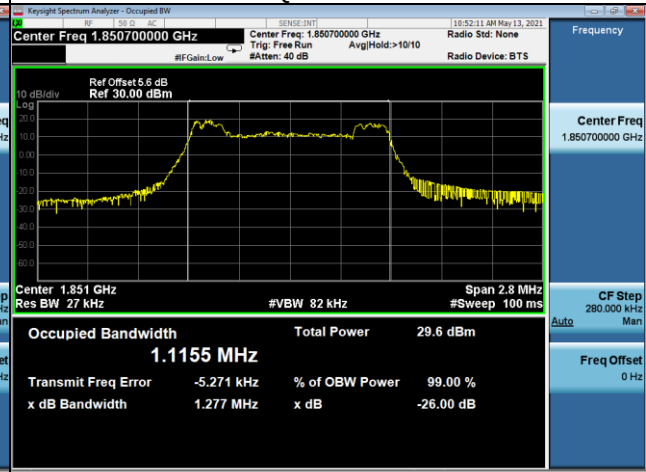
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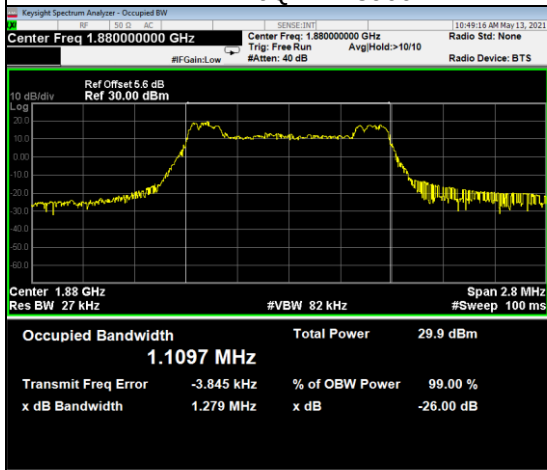
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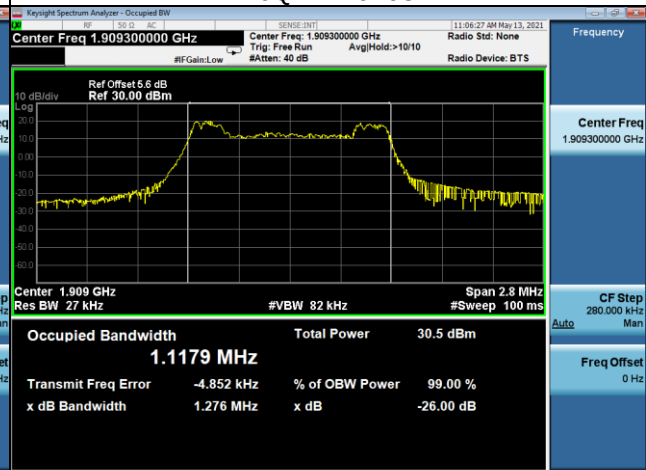
16QAM-18607



16QAM-18900



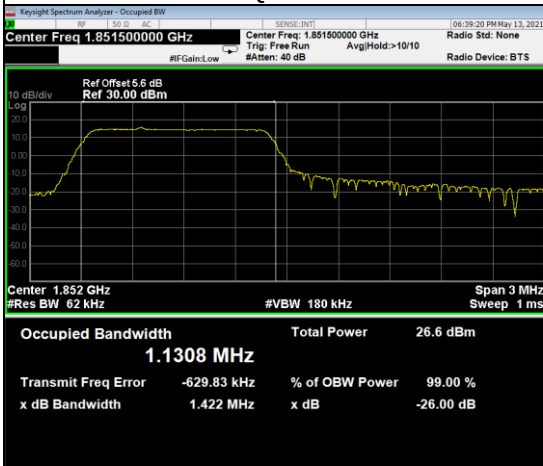
16QAM-19193



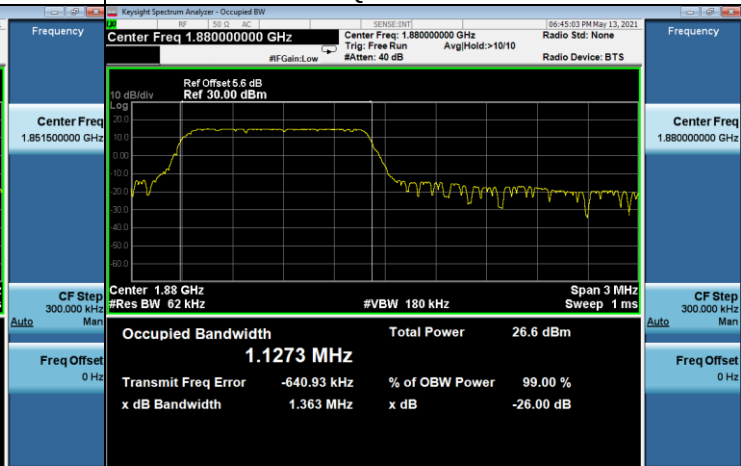
LTE Band 2_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18615	1851.5	1.1308	18615	1851.5	1.422
18900	1880	1.1273	18900	1880	1.363
19185	1908.5	1.1225	19185	1908.5	1.369
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18615	1851.5	0.9666	18615	1851.5	1.189
18900	1880	0.9716	18900	1880	1.380
19185	1908.5	0.9774	19185	1908.5	1.371

Spectrum Plot

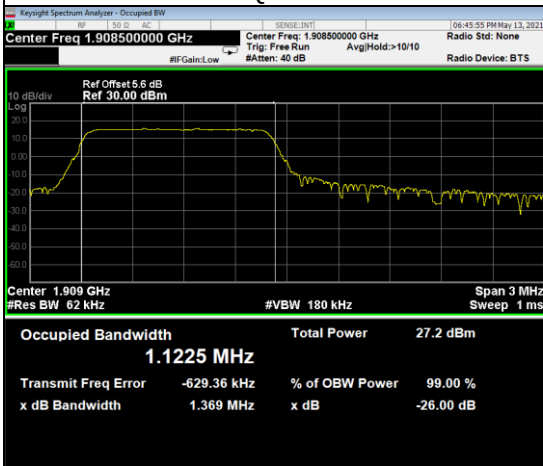
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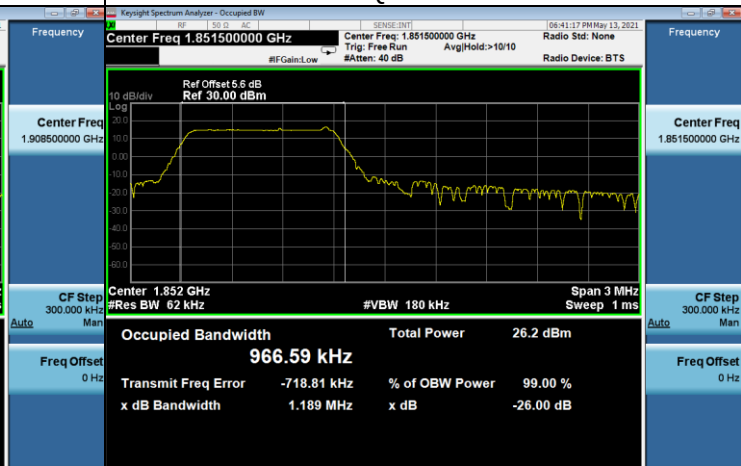
QPSK-18900



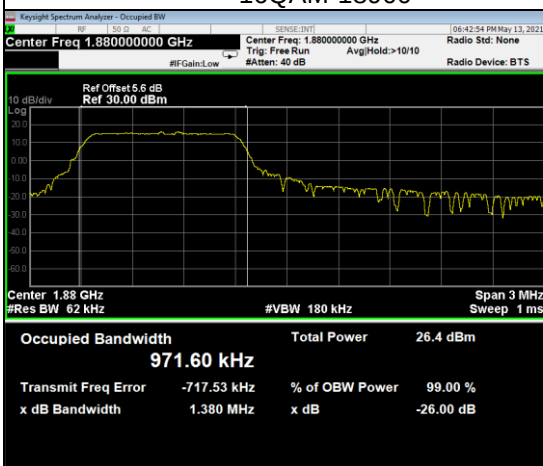
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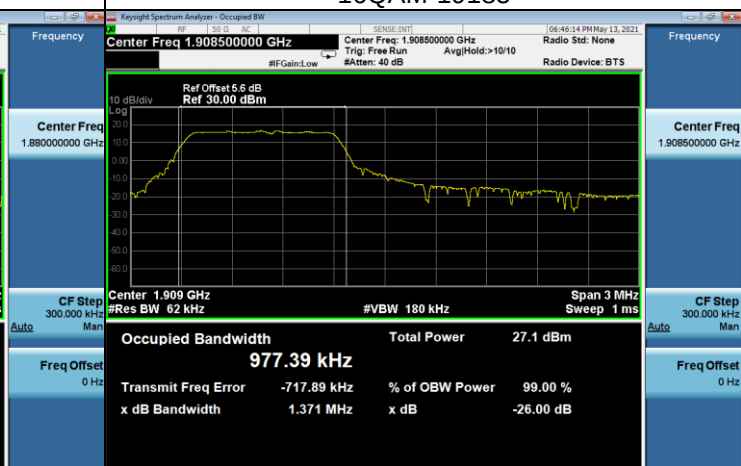
16QAM-18615



16QAM-18900



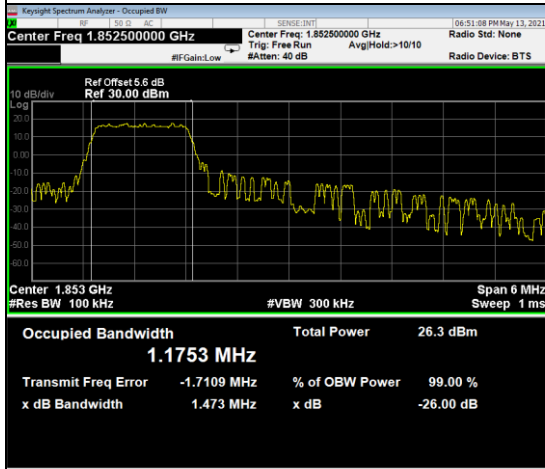
16QAM-19185



LTE Band 2_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18625	1852.5	1.1753	18625	1852.5	1.473
18900	1880	1.1931	18900	1880	1.470
19175	1907.5	1.1929	19175	1907.5	1.630
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18625	1852.5	1.0301	18625	1852.5	1.245
18900	1880	1.0301	18900	1880	1.496
19175	1907.5	1.0729	19175	1907.5	1.737

Spectrum Plot

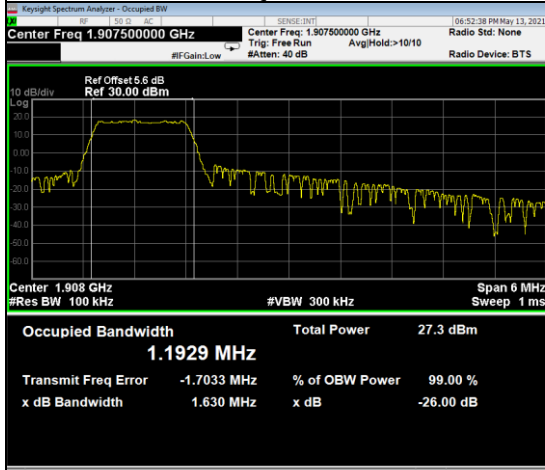
QPSK-18625



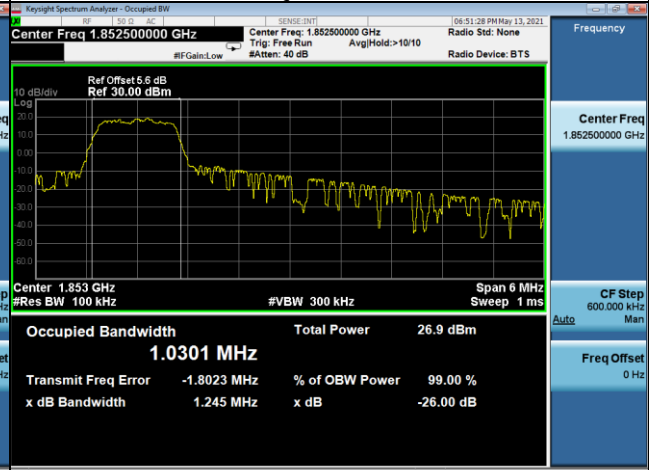
QPSK-18900



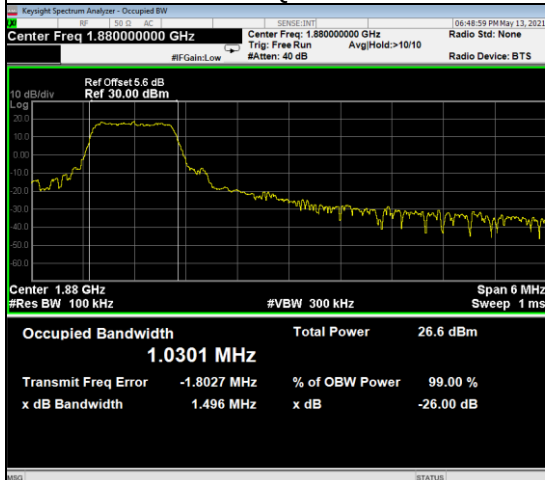
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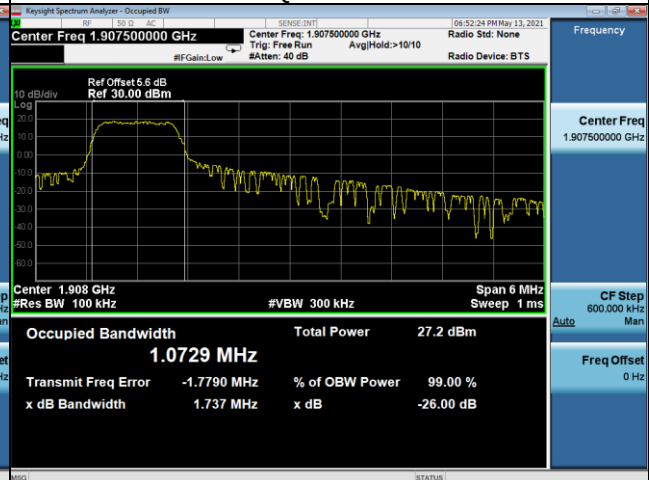
16QAM-18625



16QAM-18900



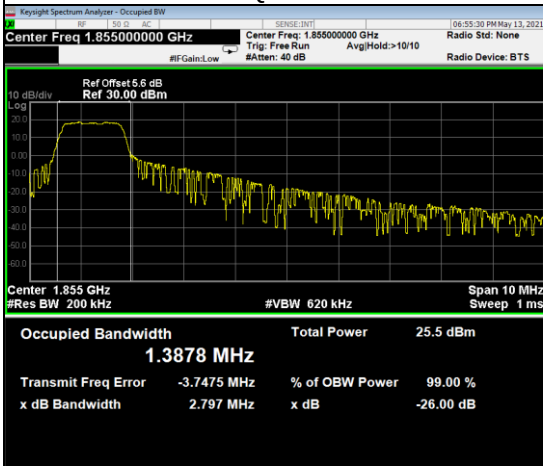
16QAM-19175



LTE Band 2_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18650	1855	1.3878	18650	1855	2.797
18900	1880	1.3605	18900	1880	2.036
19150	1905	1.3462	19150	1905	1.985
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18650	1855	1.3286	18650	1855	2.532
18900	1880	1.1829	18900	1880	1.739
19150	1905	1.2735	19150	1905	2.126

Spectrum Plot

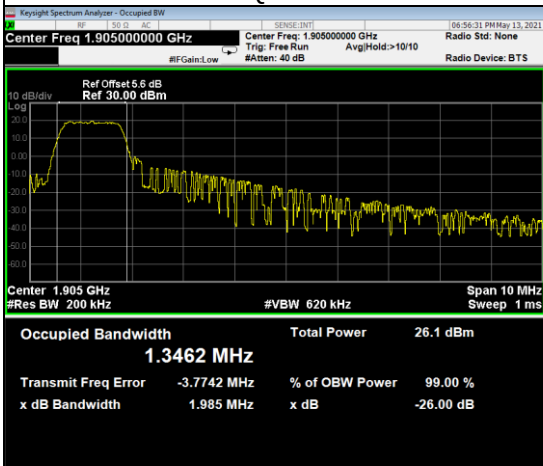
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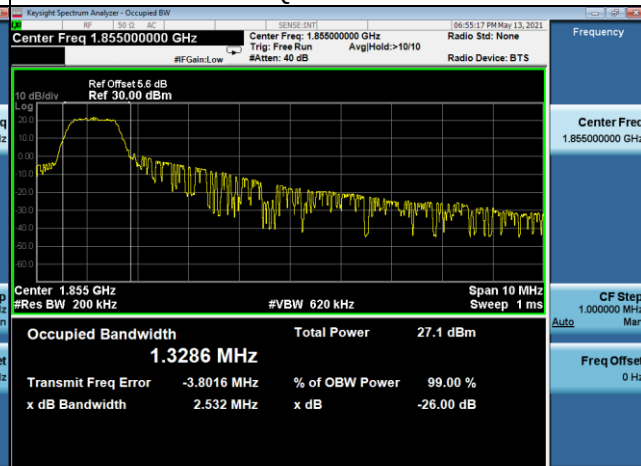
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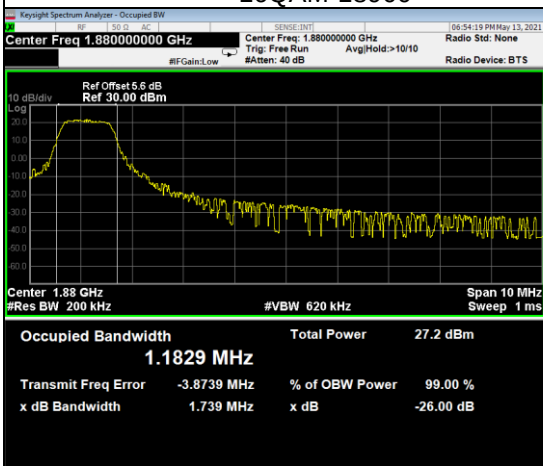
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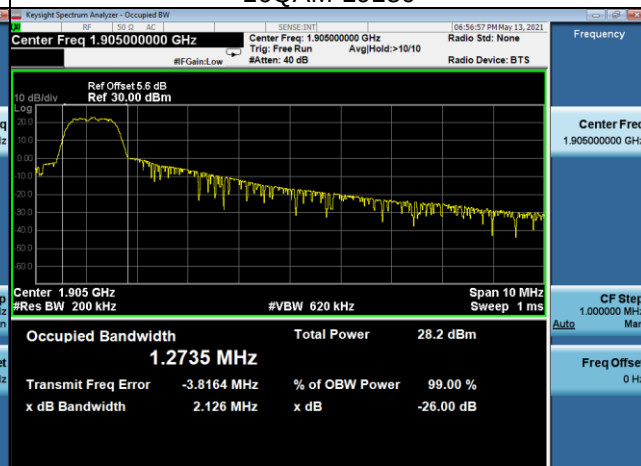
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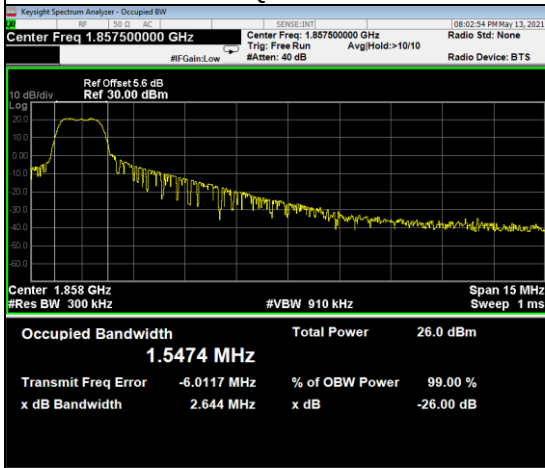
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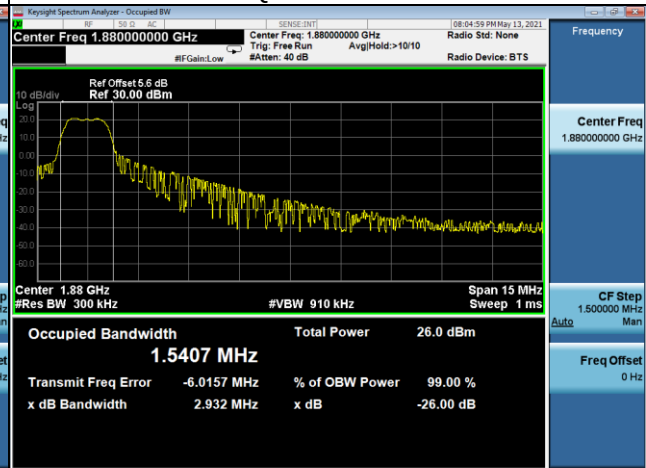
LTE Band 2_15M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18675	1857.5	1.5474	18675	1857.5	2.644
18900	1880	1.5407	18900	1880	2.932
19125	1902.5	1.5902	19125	1902.5	3.671
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18675	1857.5	1.3382	18675	1857.5	2.081
18900	1880	1.3559	18900	1880	2.030
19125	1902.5	1.7776	19125	1902.5	3.467

Spectrum Plot

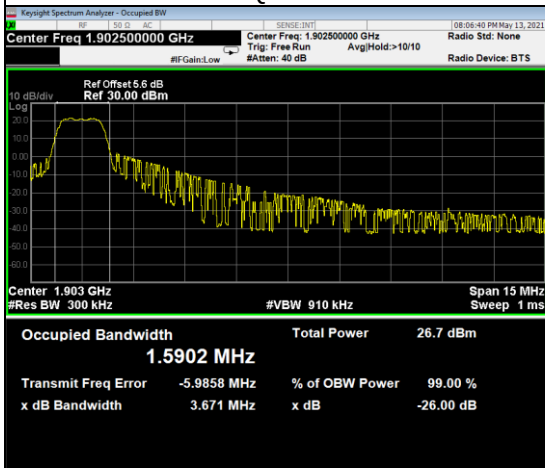
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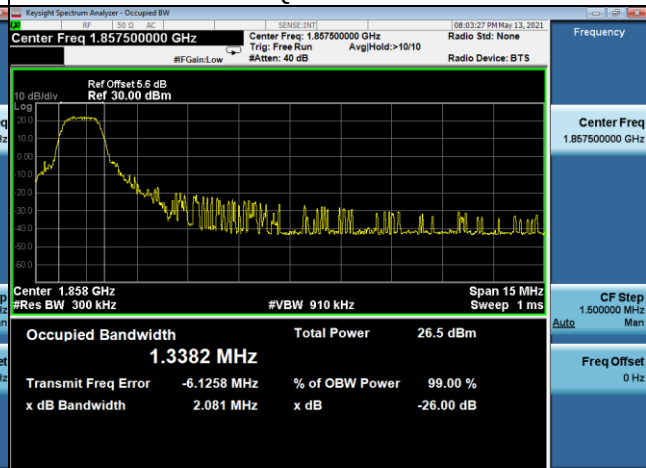
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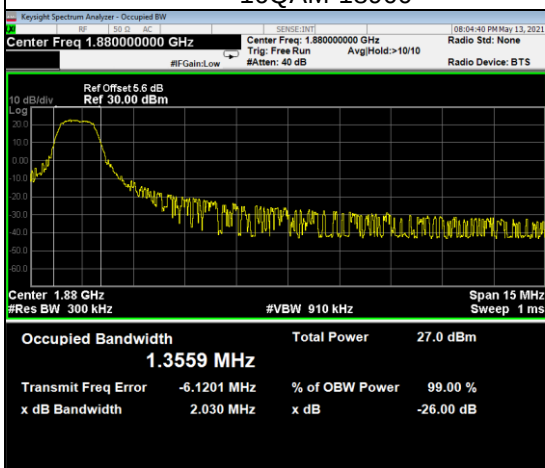
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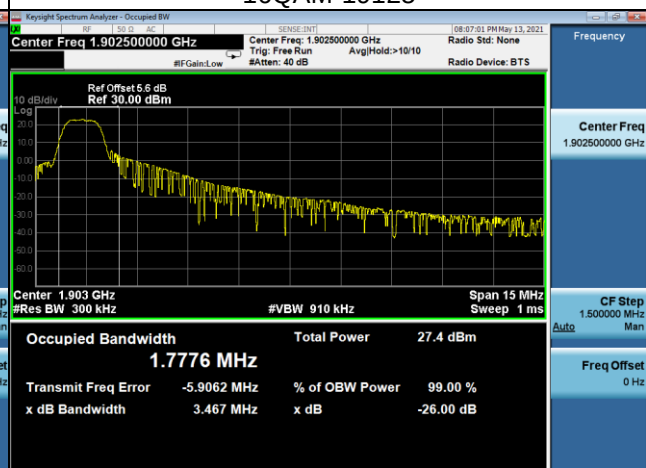
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16QAM-18900



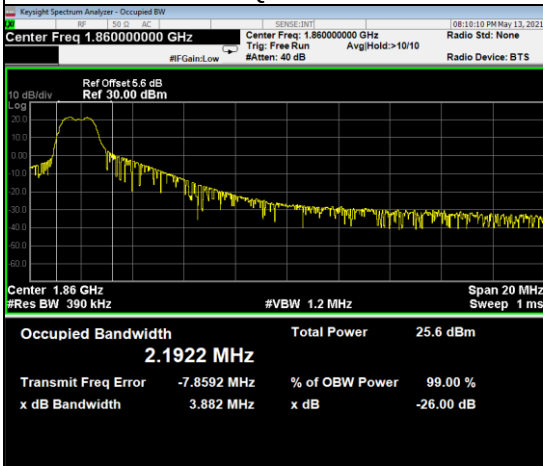
16QAM-19125



LTE Band 2_20M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18700	1860	2.1922	18700	1860	3.882
18900	1880	2.1966	18900	1880	3.902
19100	1900	1.8748	19100	1900	3.611
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
18700	1860	1.5479	18700	1860	2.362
18900	1880	1.8707	18900	1880	3.783
19100	1900	1.5419	19100	1900	2.377

Spectrum Plot

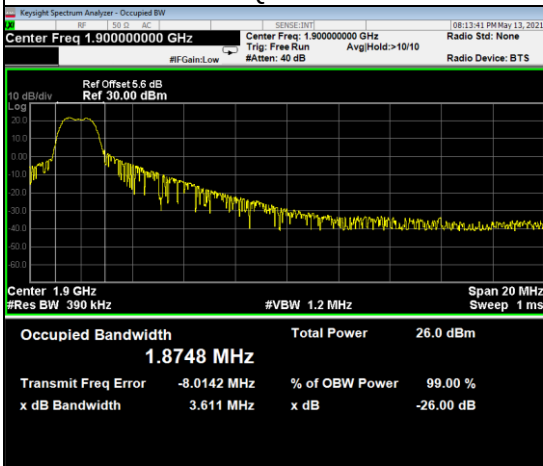
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QPSK-18900



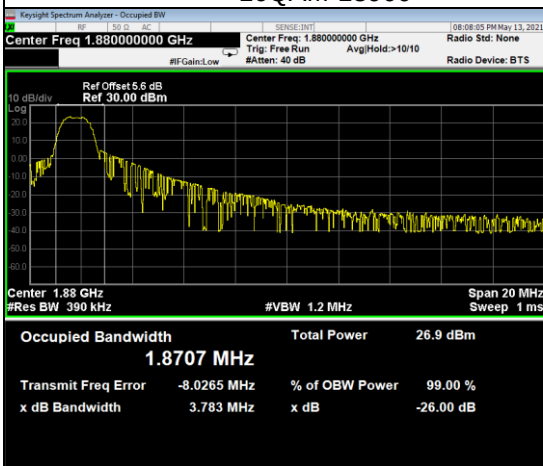
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16QAM-18700



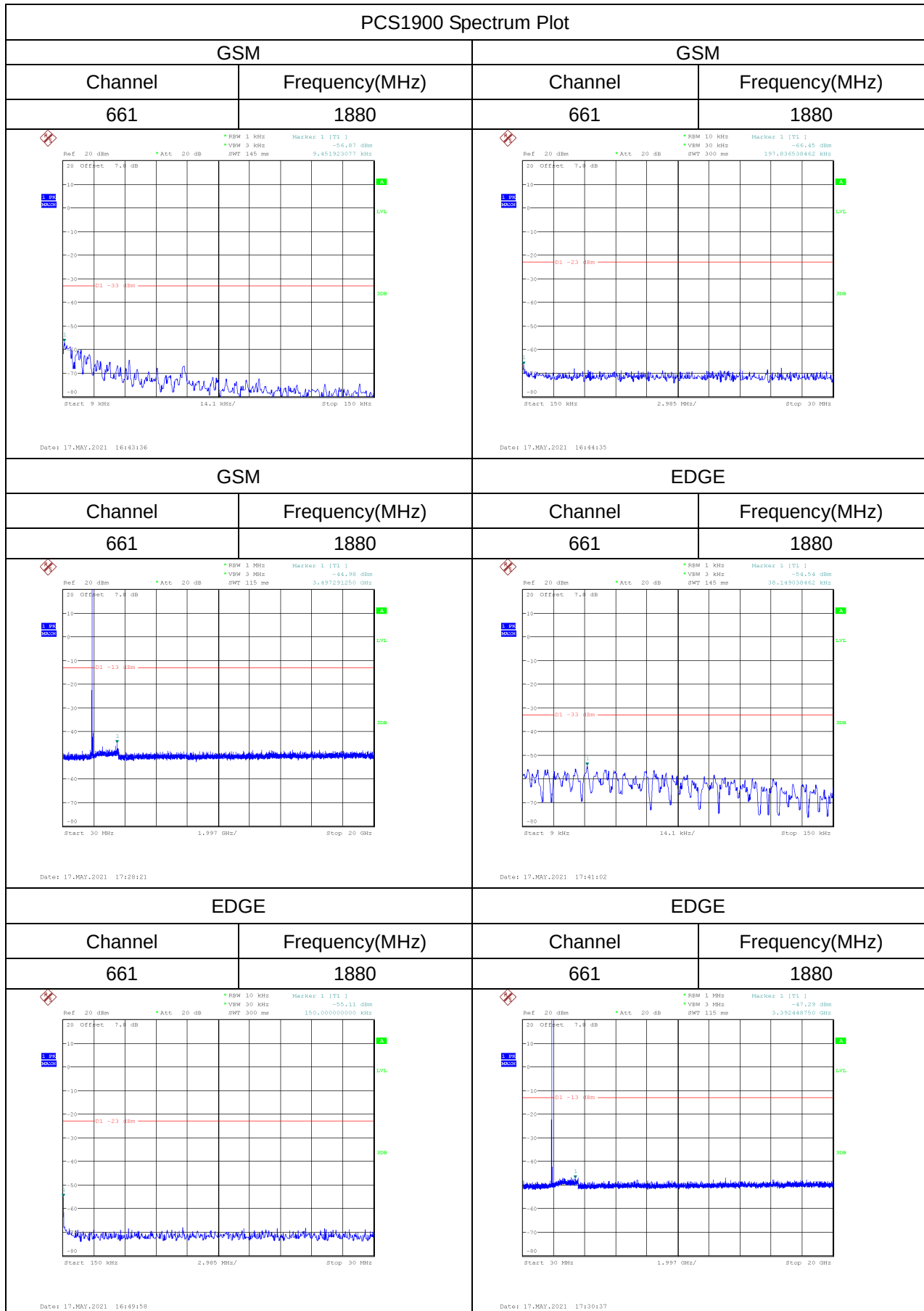
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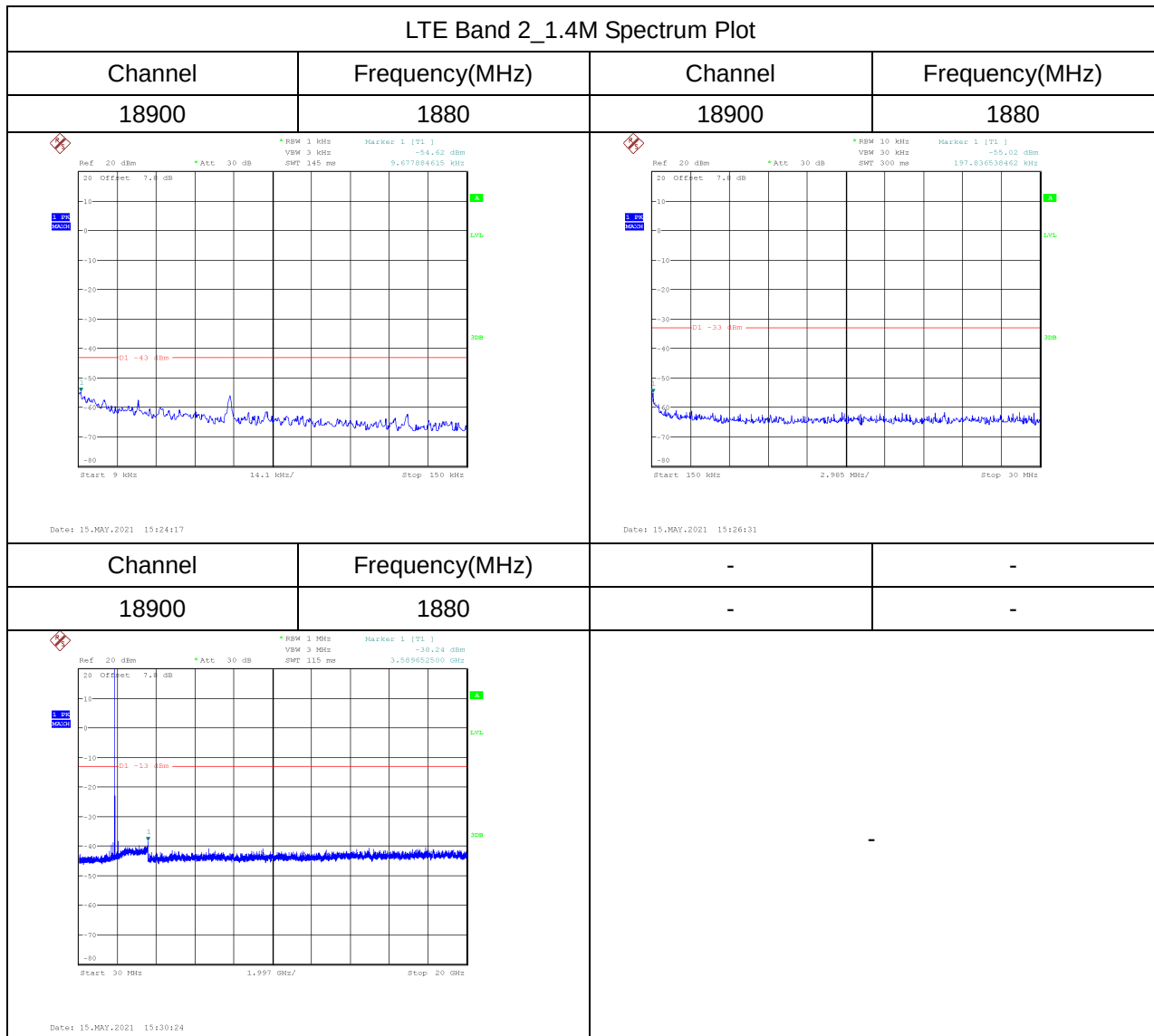


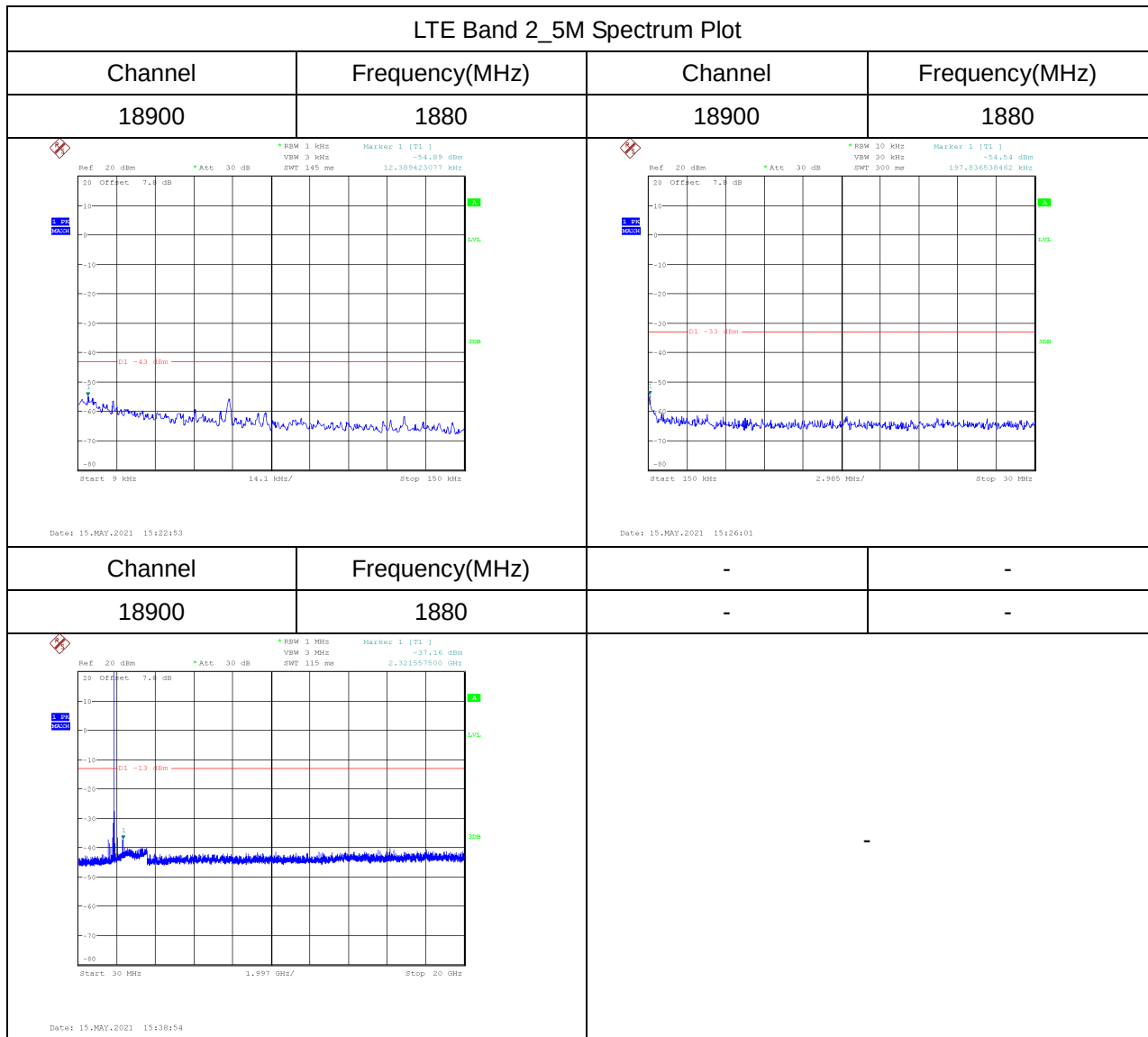
16QAM-19100

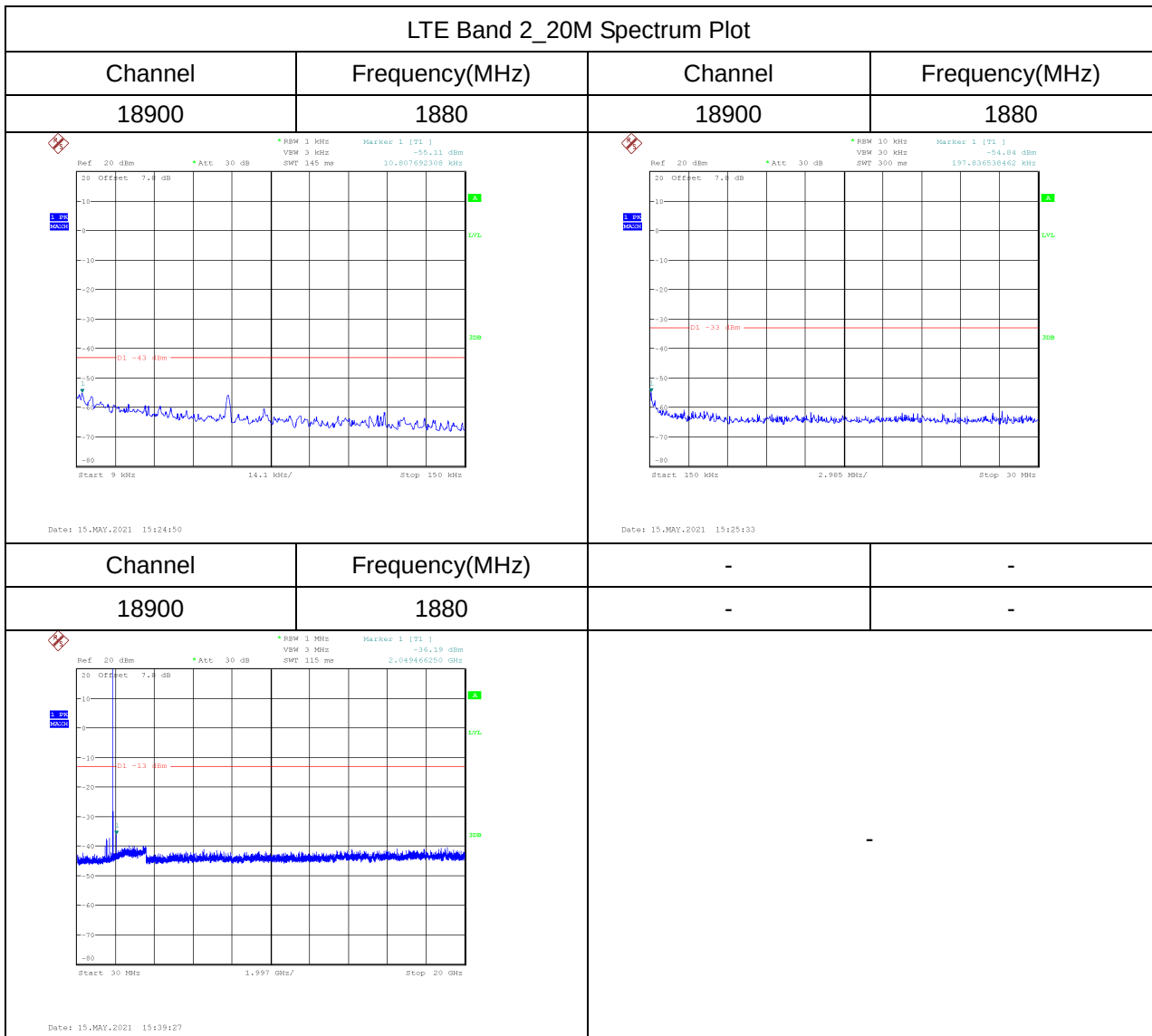


APPENDIX C - CONDUCTED SPURIOUS EMISSIONS





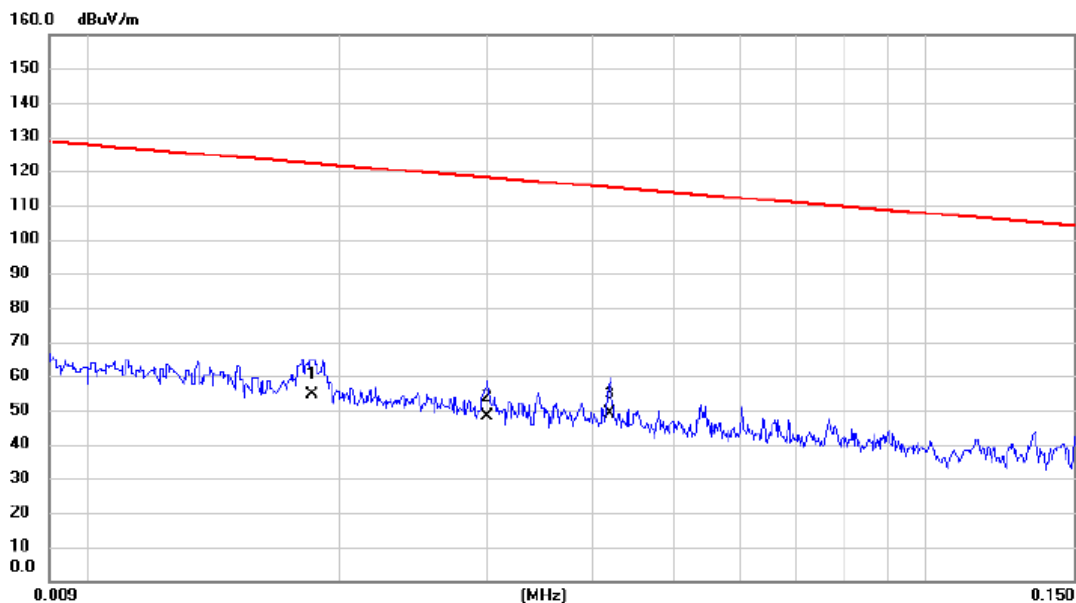




APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)

Test Mode	TX Mode
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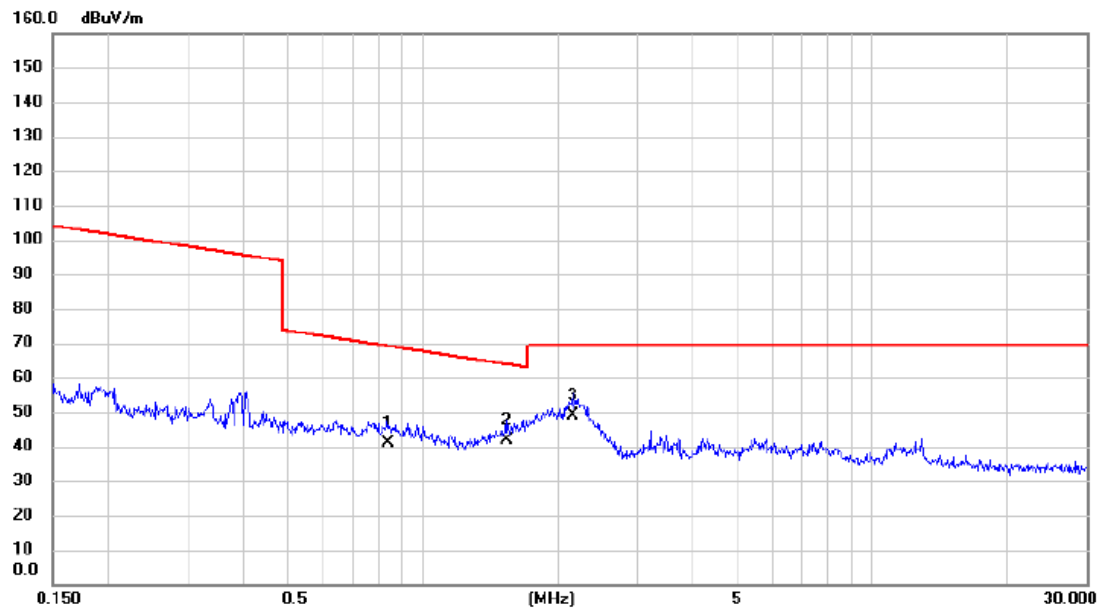
Ant 0°



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment				
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.0185	40.88	13.68	54.56	122.26	-67.70	AVG	
2		0.0300	35.19	12.95	48.14	118.06	-69.92	AVG	
3	*	0.0420	36.24	12.63	48.87	115.14	-66.27	AVG	

Test Mode	TX Mode
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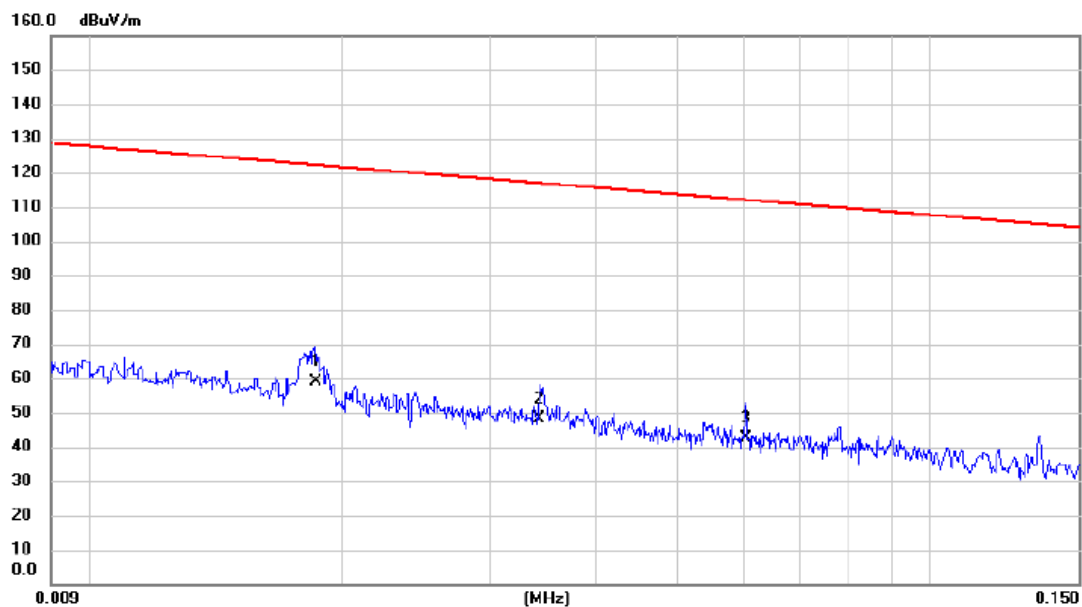
Ant 0°



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		0.8350	28.98	11.87	40.85	69.17	-28.32	QP	
2		1.5355	30.24	11.53	41.77	63.88	-22.11	QP	
3	*	2.1552	37.65	11.23	48.88	69.54	-20.66	QP	

Test Mode	TX Mode
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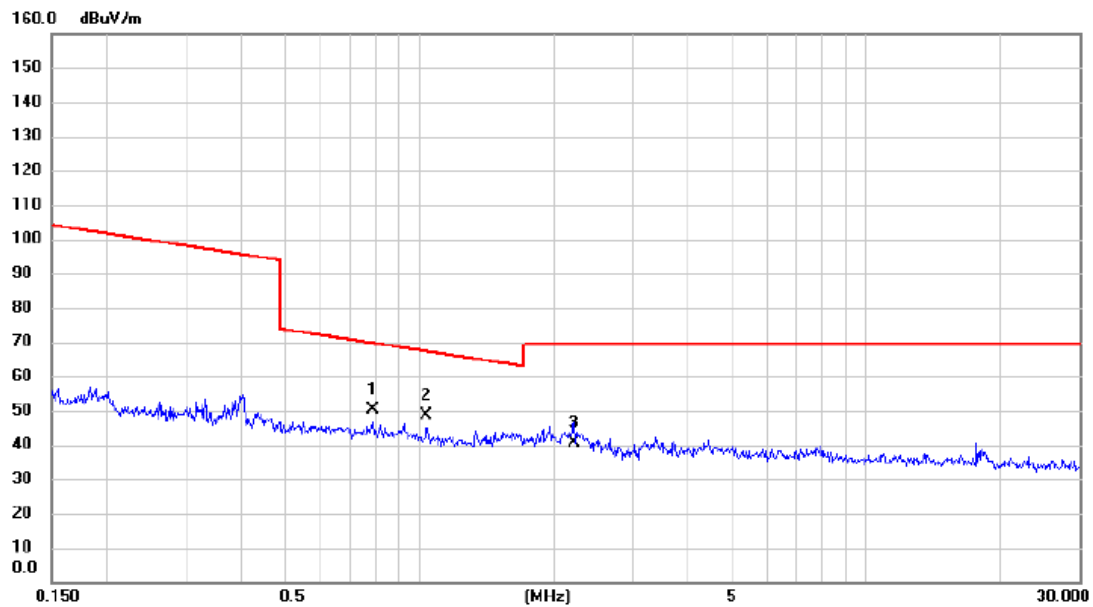
Ant 90°



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	0.0186	45.18	13.65	58.83	122.21	-63.38	AVG	
2		0.0343	35.27	12.84	48.11	116.90	-68.79	AVG	
3		0.0603	30.06	12.48	42.54	112.00	-69.46	AVG	

Test Mode	TX Mode
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Ant 90°

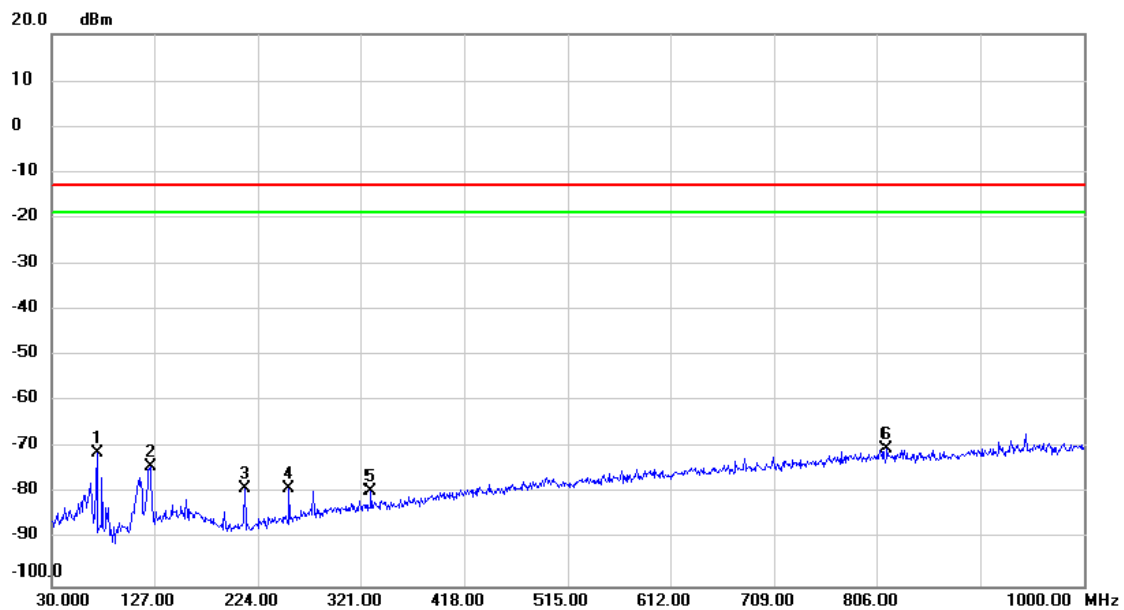


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin		
		MHz	Level	Factor	ment				
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		0.7876	38.41	11.88	50.29	69.68	-19.39	QP	
2	*	1.0374	36.74	11.78	48.52	67.29	-18.77	QP	
3		2.2250	29.25	11.20	40.45	69.54	-29.09	QP	

APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)

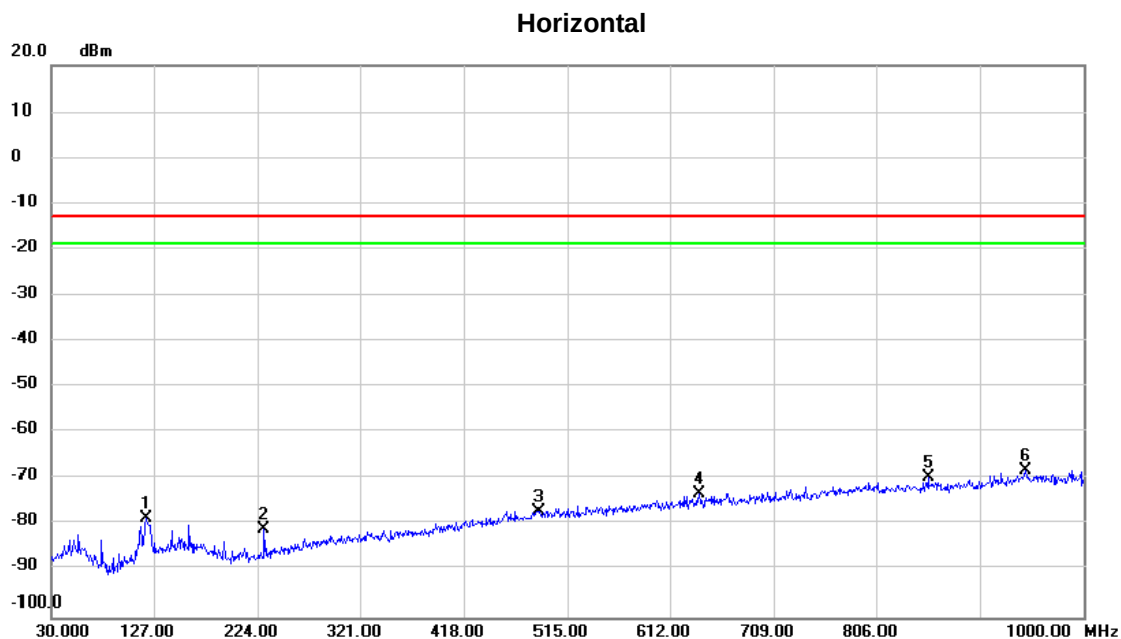
Test Mode	PCS1900_TX CH661_GSM
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Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		73.165	-63.80	-7.31	-71.11	-13.00	-58.11	peak	
2		123.120	-69.72	-4.33	-74.05	-13.00	-61.05	peak	
3		211.390	-73.31	-5.57	-78.88	-13.00	-65.88	peak	
4		253.100	-75.58	-3.22	-78.80	-13.00	-65.80	peak	
5		329.730	-78.84	-0.76	-79.60	-13.00	-66.60	peak	
6	*	814.730	-79.20	8.93	-70.27	-13.00	-57.27	peak	

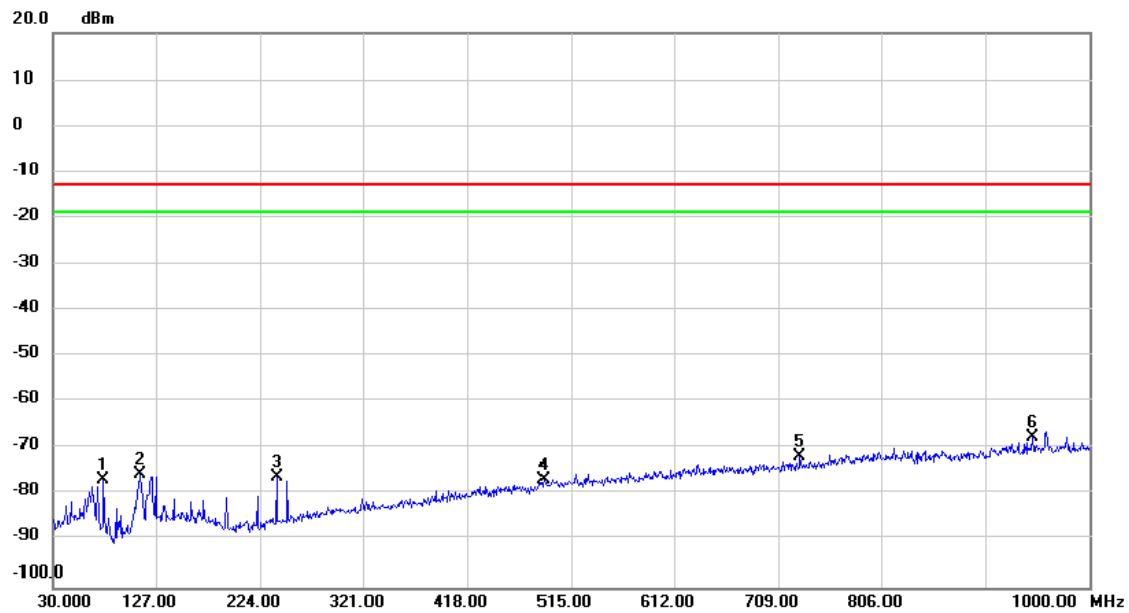
Test Mode	PCS1900_TX CH661_GSM
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No. Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	119.725	-73.82	-4.59	-78.41	-13.00	-65.41	peak	
2	230.305	-76.71	-4.33	-81.04	-13.00	-68.04	peak	
3	487.840	-79.77	2.83	-76.94	-13.00	-63.94	peak	
4	639.160	-78.68	5.67	-73.01	-13.00	-60.01	peak	
5	854.015	-78.60	9.02	-69.58	-13.00	-56.58	peak	
6 *	946.165	-79.46	11.27	-68.19	-13.00	-55.19	peak	

Test Mode	LTE Band 2_TX CH18900_1.4M
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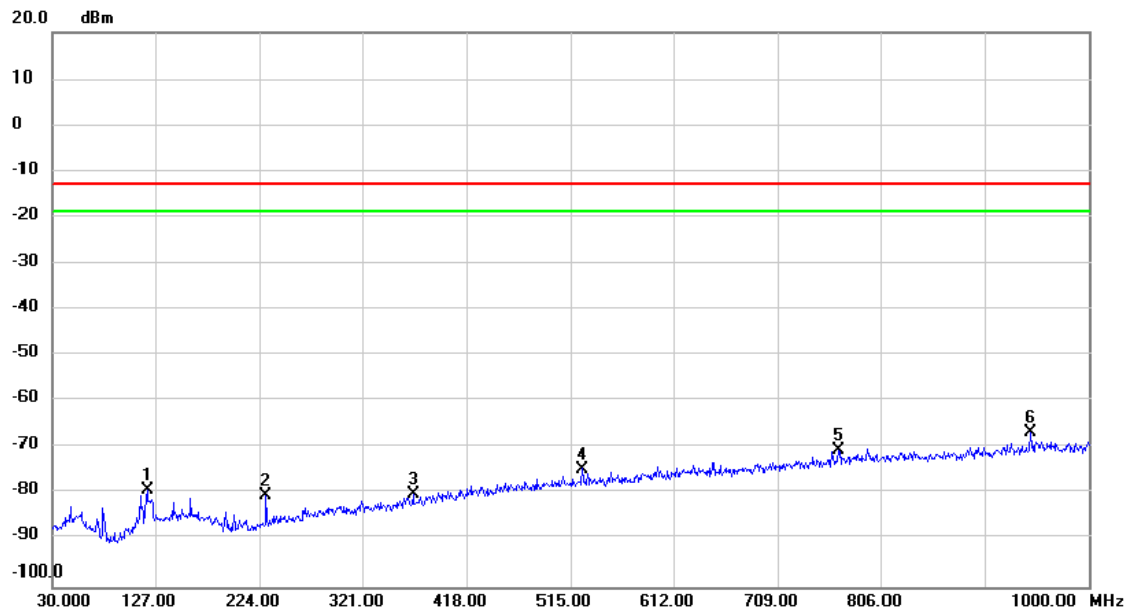
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		77.530	-58.81	-17.86	-76.67	-13.00	-63.67	peak	
2		111.965	-60.64	-14.86	-75.50	-13.00	-62.50	peak	
3		240.005	-62.78	-13.38	-76.16	-13.00	-63.16	peak	
4		490.265	-70.03	-6.71	-76.74	-13.00	-63.74	peak	
5		729.370	-69.23	-2.41	-71.64	-13.00	-58.64	peak	
6	*	948.105	-69.14	1.74	-67.40	-13.00	-54.40	peak	

Test Mode	LTE Band 2_TX CH18900_1.4M
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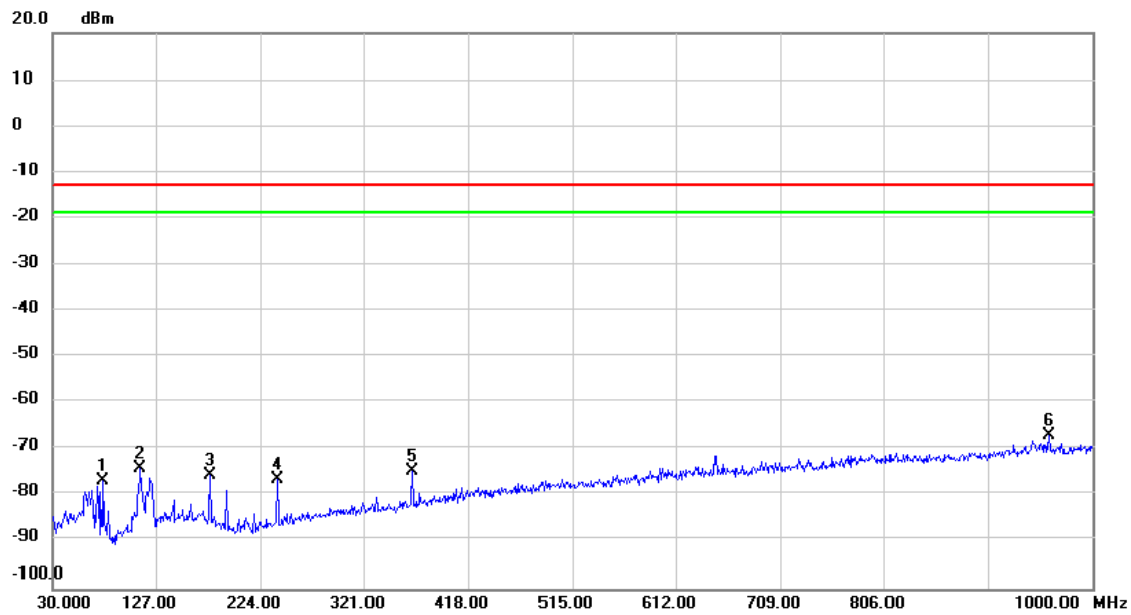
Horizontal



No. Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	119.725	-64.84	-14.18	-79.02	-13.00	-66.02	peak	
2	230.305	-66.28	-13.92	-80.20	-13.00	-67.20	peak	
3	368.045	-70.40	-9.53	-79.93	-13.00	-66.93	peak	
4	525.670	-68.28	-6.22	-74.50	-13.00	-61.50	peak	
5	766.715	-69.01	-1.52	-70.53	-13.00	-57.53	peak	
6 *	946.165	-68.35	1.68	-66.67	-13.00	-53.67	peak	

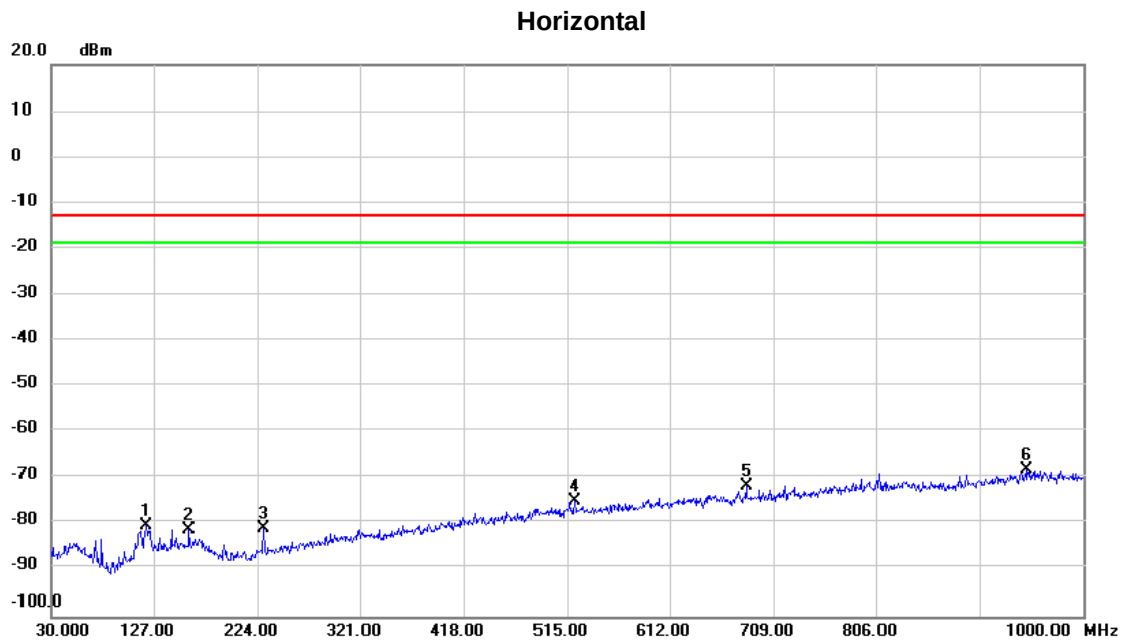
Test Mode	LTE Band 2_TX CH18900_5M
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Vertical



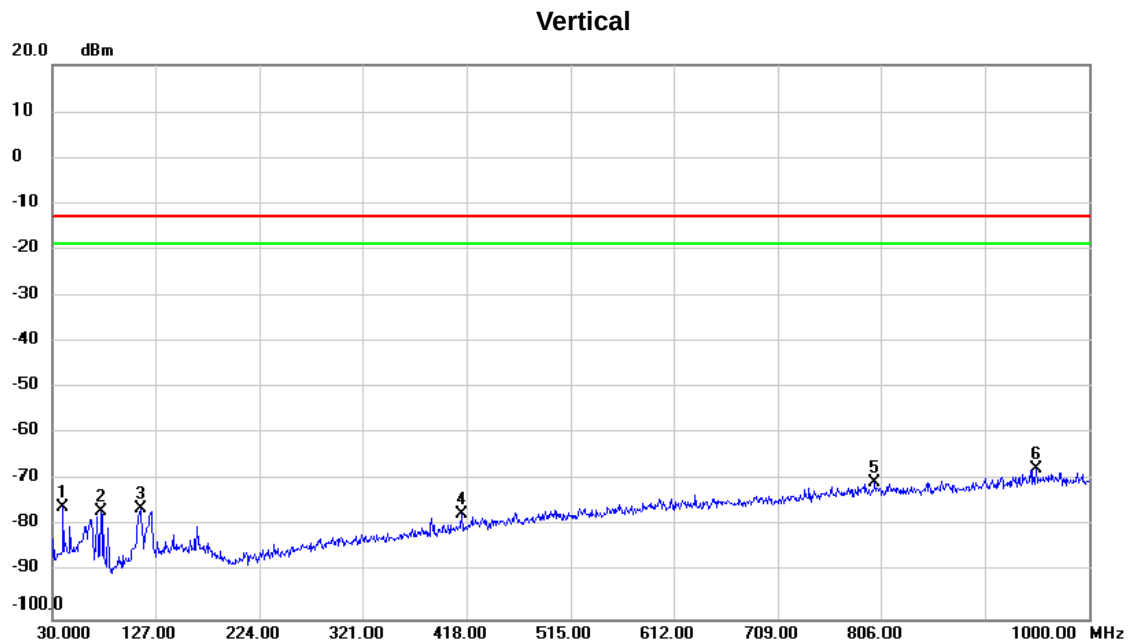
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector	Comment
		MHz	dBm	dB	dBm	dBm	dB		
1		77.530	-58.90	-17.86	-76.76	-13.00	-63.76	peak	
2		112.450	-59.35	-14.82	-74.17	-13.00	-61.17	peak	
3		176.955	-62.26	-13.32	-75.58	-13.00	-62.58	peak	
4		240.005	-63.16	-13.38	-76.54	-13.00	-63.54	peak	
5		366.105	-65.18	-9.58	-74.76	-13.00	-61.76	peak	
6	*	960.230	-68.74	1.81	-66.93	-13.00	-53.93	peak	

Test Mode	LTE Band 2_TX CH18900_5M
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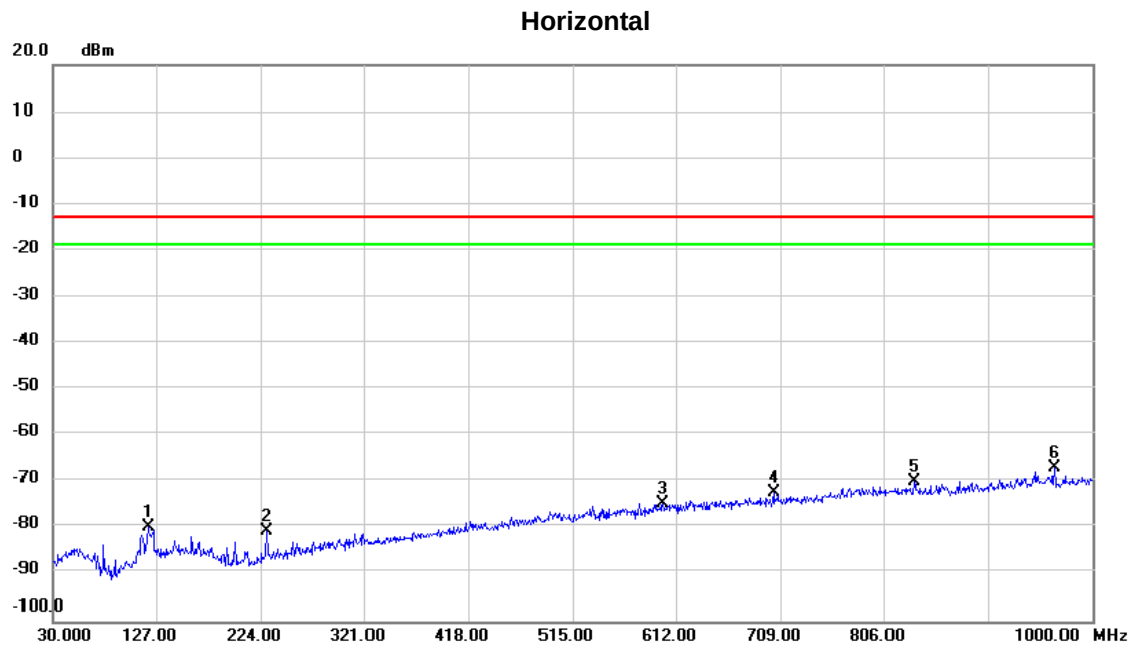
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		120.210	-66.20	-14.15	-80.35	-13.00	-67.35	peak	
2		159.980	-68.75	-12.37	-81.12	-13.00	-68.12	peak	
3		230.305	-66.99	-13.92	-80.91	-13.00	-67.91	peak	
4		522.275	-68.73	-6.26	-74.99	-13.00	-61.99	peak	
5		683.295	-68.41	-3.29	-71.70	-13.00	-58.70	peak	
6	*	948.105	-69.76	1.74	-68.02	-13.00	-55.02	peak	

Test Mode	LTE Band 2_TX CH18900_20M
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No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		40.185	-61.51	-14.20	-75.71	-13.00	-62.71	peak	
2		75.590	-59.27	-17.45	-76.72	-13.00	-63.72	peak	
3		112.935	-61.41	-14.78	-76.19	-13.00	-63.19	peak	
4		413.635	-69.01	-8.41	-77.42	-13.00	-64.42	peak	
5		800.180	-69.77	-0.68	-70.45	-13.00	-57.45	peak	
6	*	951.985	-69.29	1.80	-67.49	-13.00	-54.49	peak	

Test Mode	LTE Band 2_TX CH18900_20M
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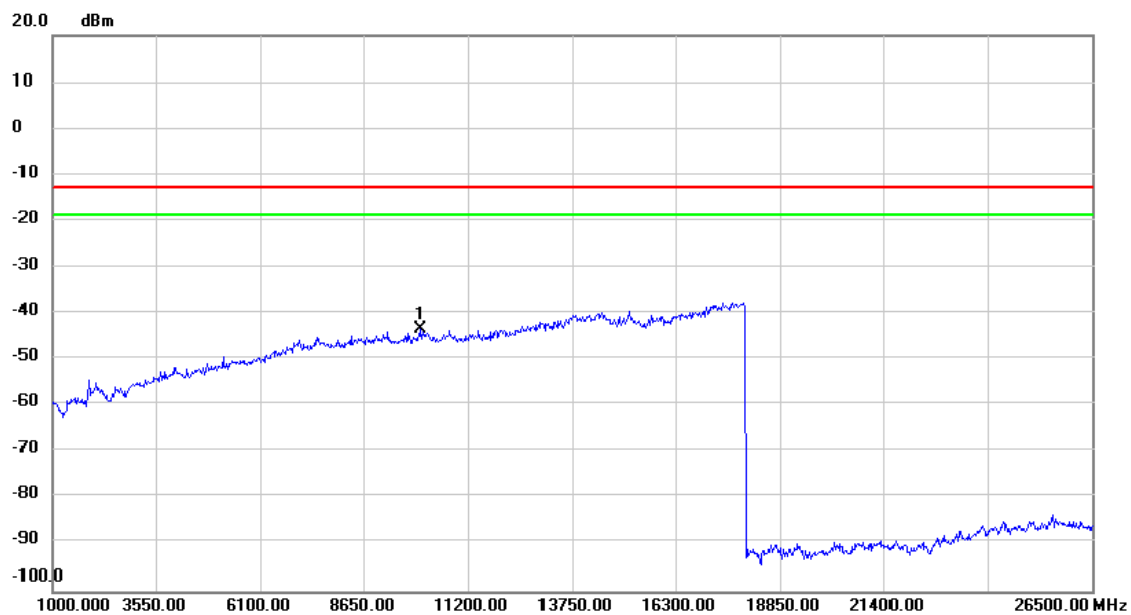


No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		119.725	-65.49	-14.18	-79.67	-13.00	-66.67	peak	
2		230.305	-66.87	-13.92	-80.79	-13.00	-67.79	peak	
3		599.875	-69.98	-4.55	-74.53	-13.00	-61.53	peak	
4		702.695	-69.16	-3.01	-72.17	-13.00	-59.17	peak	
5		833.160	-69.07	-0.66	-69.73	-13.00	-56.73	peak	
6	*	965.565	-68.65	1.81	-66.84	-13.00	-53.84	peak	

APPENDIX C - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)

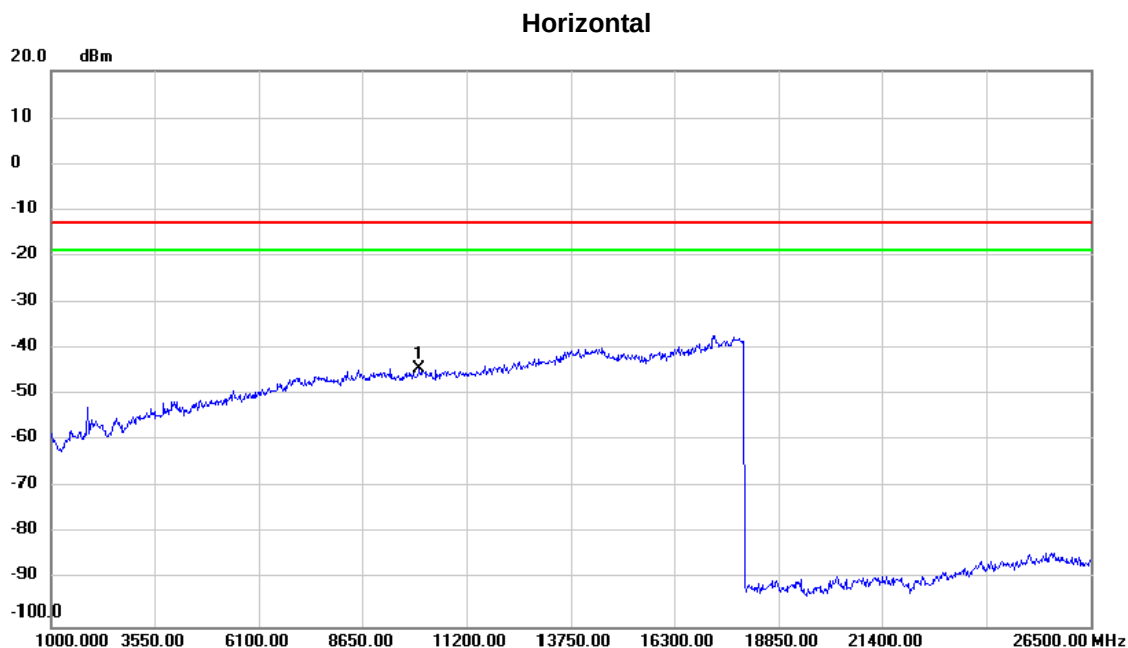
Test Mode	PCS1900_TX CH661_GSM
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Vertical



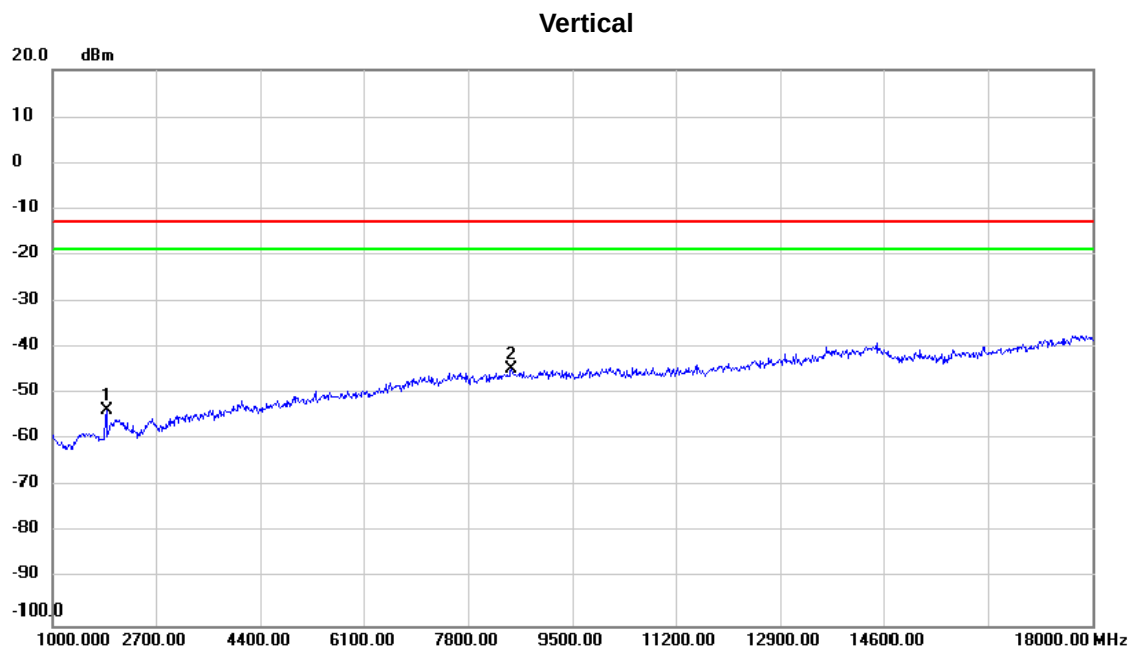
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10039.750	-67.34	23.83	-43.51	-13.00	-30.51	peak	

Test Mode	PCS1900_TX CH661_GSM
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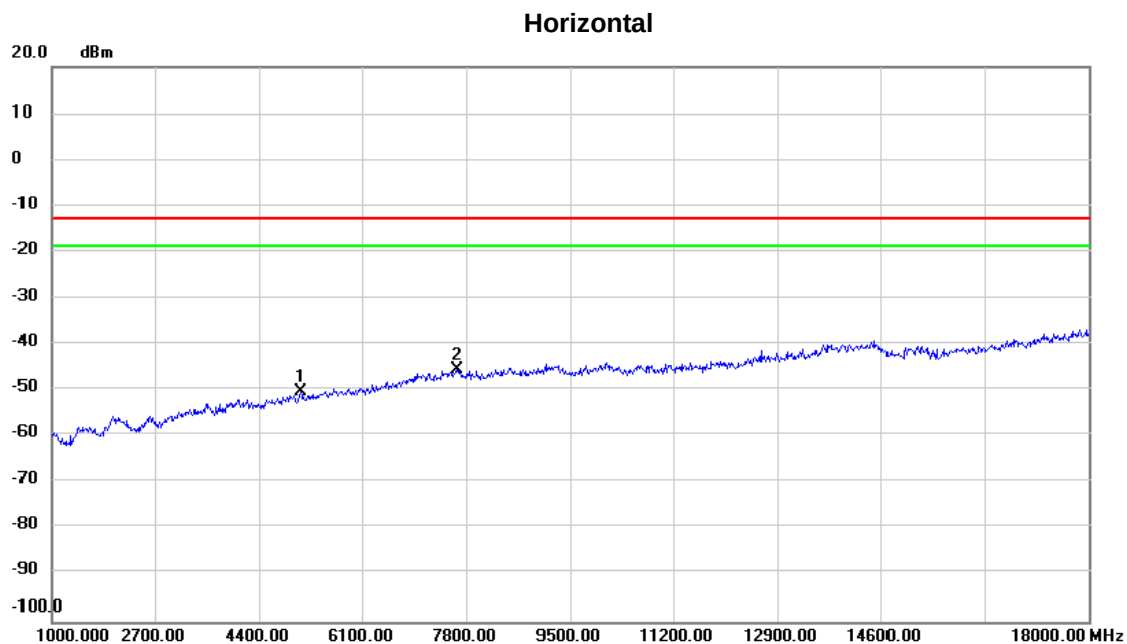
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1	*	10027.000	-68.16	23.82	-44.34	-13.00	-31.34	peak	

Test Mode	LTE Band 2_TX CH18900_1.4M
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No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		1884.000	-50.10	-3.51	-53.61	-13.00	-40.61	peak	
2	*	8514.000	-55.86	11.19	-44.67	-13.00	-31.67	peak	

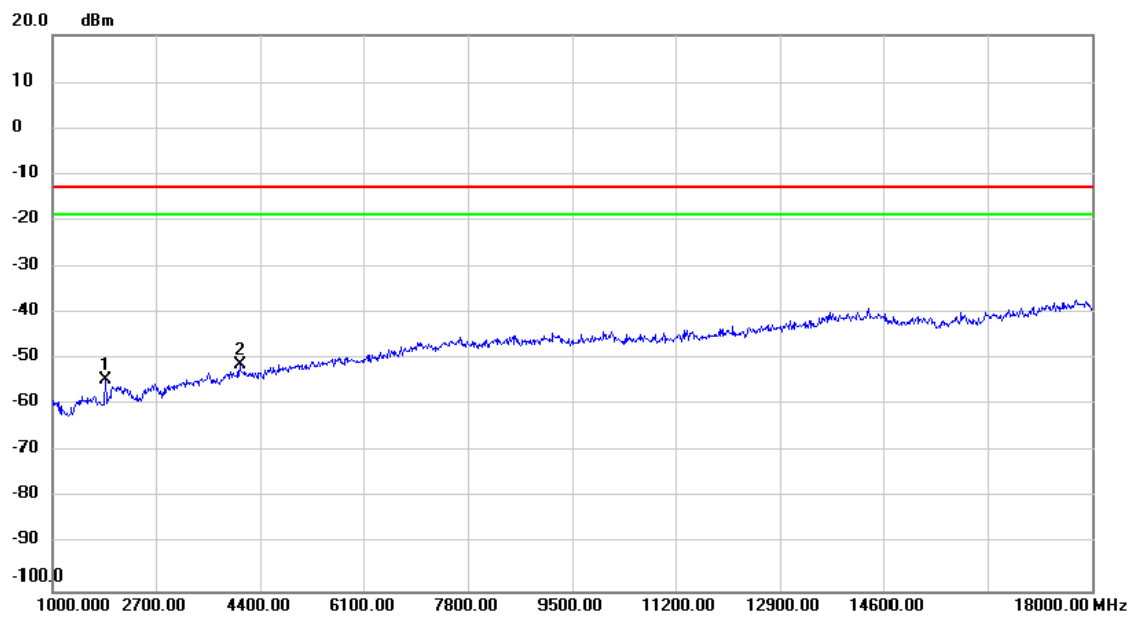
Test Mode	LTE Band 2_TX CH18900_1.4M
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No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		5080.000	-55.43	5.10	-50.33	-13.00	-37.33	peak	
2	*	7647.000	-56.14	10.53	-45.61	-13.00	-32.61	peak	

Test Mode	LTE Band 2_ TX CH18900_5M
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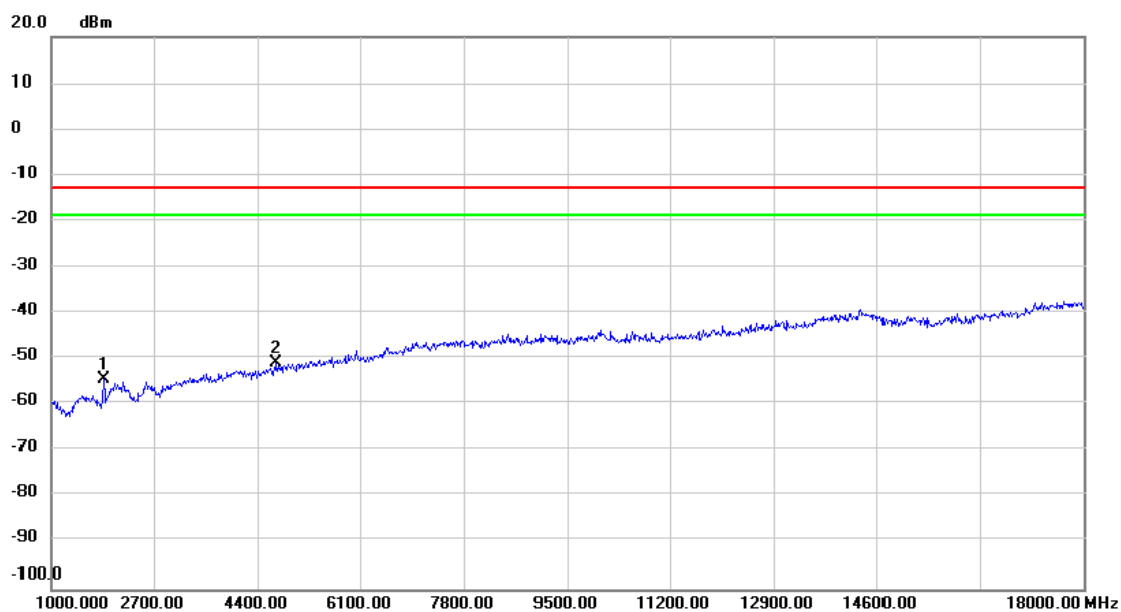
Vertical



No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		1875.500	-51.05	-3.58	-54.63	-13.00	-41.63	peak	
2	*	4060.000	-54.45	3.09	-51.36	-13.00	-38.36	peak	

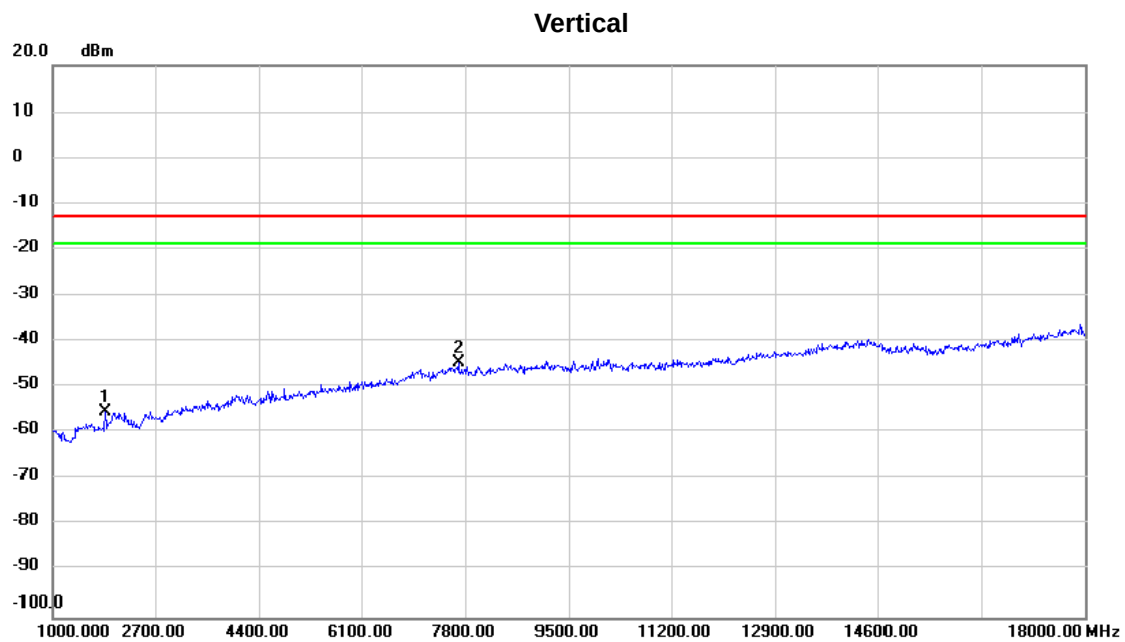
Test Mode	LTE Band 2_ TX CH18900_5M
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Horizontal



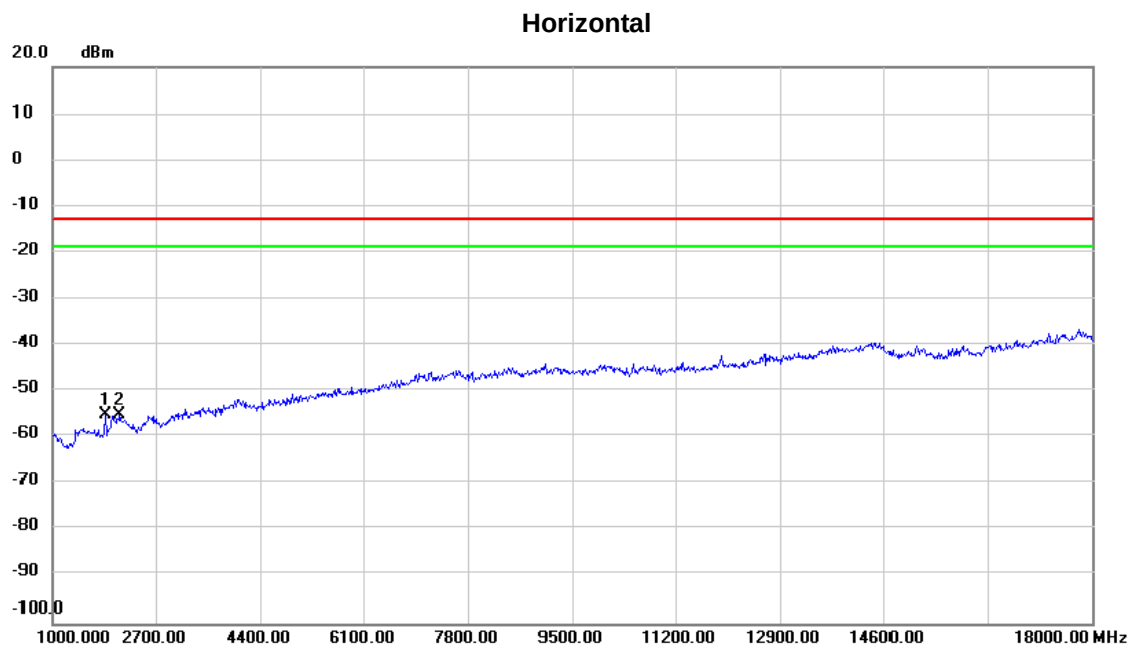
No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		1875.500	-50.99	-3.58	-54.57	-13.00	-41.57	peak	
2	*	4706.000	-55.12	4.13	-50.99	-13.00	-37.99	peak	

Test Mode	LTE Band 2_TX CH18900_20M
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No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		1875.500	-51.97	-3.58	-55.55	-13.00	-42.55	peak	
2	*	7689.500	-55.23	10.50	-44.73	-13.00	-31.73	peak	

Test Mode	LTE Band 2_TX CH18900_20M
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No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Margin dB	Detector	Comment
1		1875.500	-51.64	-3.58	-55.22	-13.00	-42.22	peak	
2	*	2105.000	-52.39	-2.70	-55.09	-13.00	-42.09	peak	

APPENDIX G - BAND EDGE