



RF TEST REPORT

Applicant Shanghai Smawave Technology Co. ,Ltd
FCC ID 2AU8HMGL6201A
Product LTE Module
Brand Smawave
Model MGL6201A
Report No. R2001A0002-R6V1
Issue Date February 20, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2(2019)/FCC CFR 47 Part 90Z(2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Kai Xu

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Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output & Effective Isotropic Radiated Power	2.1046/90.1321(a)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Emission Mask	90.210(b)	PASS
4	Frequency Stability	2.1055	PASS
5	Spurious Emissions at Antenna Terminals	2.1051 / 90.1323	PASS
6	Field Strength of Spurious Radiation / Radiated Spurious Emissions	2.1053/ 90.1323	PASS
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			
Date of Testing: October 1, 2019~ November 7, 2019 and December 31, 2019			



1. Test Laboratory

1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
Country: P. R. China
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Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Shanghai Smawave Technology Co., Ltd
Applicant address	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China
Manufacturer	Shanghai Smawave Technology Co., Ltd
Manufacturer address	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China

2.2. General Information

EUT Description			
Model	MGL6201A		
IMEI	860524031979550		
Hardware Version	V2.0		
Software Version	CAT12-A		
Power Supply	External Power Supply		
Antenna Type	External Antenna		
Antenna Gain	3.18dBi		
Test Mode(s)	LTE Band 48		
Test Modulation	(LTE)QPSK 16QAM 64QAM;		
Maximum E.I.R.P.	LTE Band 48:	27.94dBm	
Rated Power Supply Voltage	3.3V		
Extreme Voltage	Minimum: 3V Maximum: 3.6V		
Extreme Temperature	Lowest: -40°C Highest: +70°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	LTE Band 48	3550 ~ 3700	3550 ~ 3700
Note: The information of the EUT is declared by the manufacturer.			



3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:

FCC CFR 47 Part 90Z (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

FCC KDB 552295 D01 CBP Guidance for 3650 3700 Band v03

4. Test Configuration

The main board of the product (product name: SGL4010) is the same as the module(module name:MGL6201A), including the PCB layout and the BOM list , without any change.

The conducted test results will reference to SGL4010 (report No.: R1909A0578-R6).

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (X axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions were investigated.

The following testing in LTE is set based on the maximum RF Output Power.

Test modes are chosen as the worst case configuration below for LTE Band 48

Test items	Bandwidth (MHz)				Modulation		RB			Test Channel		
	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output and Effective Isotropic Radiated power	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	-	-	O	O	O	O
Emission Mask	O	O	O	O	O	O	O	-	O	O	-	O
Frequency Stability	O	O	O	O	O	O	-	-	O	-	O	-
Spurious Emissions at Antenna Terminals	O	O	O	O	O	-	O	-	-	O	O	O
Field Strength of Spurious Radiation/ Radiates Spurious Emission	O	-	-	O	O	-	O	-	-	-	O	-
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.											

5. Test Case Results

5.1. RF Power Output & Effective Isotropic Radiated Power& the Peak EIRP Density

Ambient condition

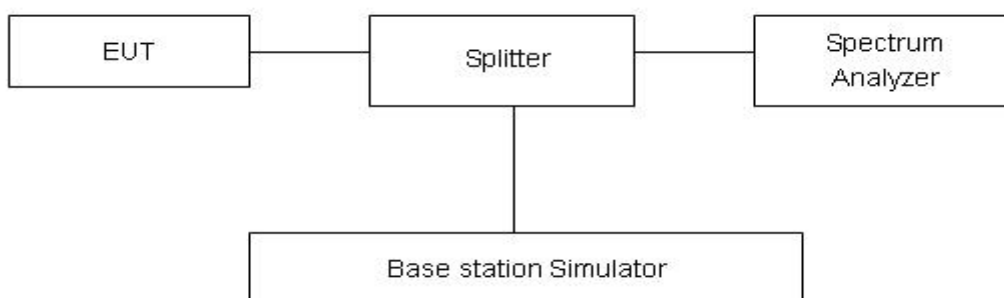
Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

During the process of the testing, The EUT is controlled by the Spectrum analyzer to ensure max power transmission and proper modulation.

Since this procedure utilizes a conducted measurement it does not directly result in EIRP levels for comparison to the output power limits. In order to determine the EIRP level, the effective antenna gain must be added to the corrected (for external test set-up factors) measurement result.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

According to FCC §2.1046 & 90.1321(a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one-megahertz slice of spectrum.

(c) Mobile and portable stations are limited to 1 watt/25 MHz EIRP. In any event, the peak EIRP density shall not exceed 40 milliwatts in any one-megahertz slice of spectrum.

Limit	Limit
Base Station/ Fixed Station	25 watts/25 MHz
Mobile and portable stations	1 watt/25 MHz

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.

Test Results

BAND	Bandwidth	Modulation	Channel	RB Configuration	Conducted Power(dBm)	EIRP(dBm)
Band48	5M	QPSK	56265	1RB#0	23.14	26.85
Band48	5M	QPSK	56265	1RB#13	22.90	26.61
Band48	5M	QPSK	56265	1RB#24	23.67	27.38
Band48	5M	QPSK	56265	12RB#0	22.77	26.48
Band48	5M	QPSK	56265	12RB#6	22.69	26.40
Band48	5M	QPSK	56265	12RB#13	23.15	26.86
Band48	5M	QPSK	56265	25RB#0	22.95	26.66
Band48	5M	QPSK	56490	1RB#0	23.60	27.31
Band48	5M	QPSK	56490	1RB#13	23.54	27.25
Band48	5M	QPSK	56490	1RB#24	23.76	27.47
Band48	5M	QPSK	56490	12RB#0	23.35	27.06
Band48	5M	QPSK	56490	12RB#6	23.31	27.02
Band48	5M	QPSK	56490	12RB#13	23.58	27.29
Band48	5M	QPSK	56490	25RB#0	23.50	27.21
Band48	5M	QPSK	56715	1RB#0	23.93	27.64
Band48	5M	QPSK	56715	1RB#13	23.51	27.22
Band48	5M	QPSK	56715	1RB#24	23.00	26.71
Band48	5M	QPSK	56715	12RB#0	23.44	27.15
Band48	5M	QPSK	56715	12RB#6	23.39	27.10
Band48	5M	QPSK	56715	12RB#13	23.17	26.88
Band48	5M	QPSK	56715	25RB#0	23.30	27.01
Band48	5M	16QAM	56265	1RB#0	23.32	27.03
Band48	5M	16QAM	56265	1RB#13	23.01	26.72
Band48	5M	16QAM	56265	1RB#24	23.73	27.44
Band48	5M	16QAM	56265	12RB#0	22.79	26.50
Band48	5M	16QAM	56265	12RB#6	22.76	26.47
Band48	5M	16QAM	56265	12RB#13	22.95	26.66
Band48	5M	16QAM	56265	25RB#0	22.89	26.60
Band48	5M	16QAM	56490	1RB#0	23.54	27.25
Band48	5M	16QAM	56490	1RB#13	23.57	27.28
Band48	5M	16QAM	56490	1RB#24	23.80	27.51
Band48	5M	16QAM	56490	12RB#0	23.46	27.17
Band48	5M	16QAM	56490	12RB#6	23.43	27.14
Band48	5M	16QAM	56490	12RB#13	23.38	27.09
Band48	5M	16QAM	56490	25RB#0	23.46	27.17
Band48	5M	16QAM	56715	1RB#0	24.23	27.94
Band48	5M	16QAM	56715	1RB#13	23.72	27.43
Band48	5M	16QAM	56715	1RB#24	23.08	26.79
Band48	5M	16QAM	56715	12RB#0	23.36	27.07



Band48	5M	16QAM	56715	12RB#6	23.32	27.03
Band48	5M	16QAM	56715	12RB#13	23.21	26.92
Band48	5M	16QAM	56715	25RB#0	23.09	26.80
Band48	5M	64QAM	56265	1RB#0	21.84	25.55
Band48	5M	64QAM	56265	1RB#13	21.33	25.04
Band48	5M	64QAM	56265	1RB#24	22.41	26.12
Band48	5M	64QAM	56265	12RB#0	21.06	24.77
Band48	5M	64QAM	56265	12RB#6	21.12	24.83
Band48	5M	64QAM	56265	12RB#13	21.28	24.99
Band48	5M	64QAM	56265	25RB#0	21.10	24.81
Band48	5M	64QAM	56490	1RB#0	21.83	25.54
Band48	5M	64QAM	56490	1RB#13	21.71	25.42
Band48	5M	64QAM	56490	1RB#24	22.22	25.93
Band48	5M	64QAM	56490	12RB#0	21.41	25.12
Band48	5M	64QAM	56490	12RB#6	21.53	25.24
Band48	5M	64QAM	56490	12RB#13	21.59	25.30
Band48	5M	64QAM	56490	25RB#0	21.49	25.20
Band48	5M	64QAM	56715	1RB#0	22.59	26.30
Band48	5M	64QAM	56715	1RB#13	21.57	25.28
Band48	5M	64QAM	56715	1RB#24	21.42	25.13
Band48	5M	64QAM	56715	12RB#0	21.63	25.34
Band48	5M	64QAM	56715	12RB#6	21.46	25.17
Band48	5M	64QAM	56715	12RB#13	20.93	24.64
Band48	5M	64QAM	56715	25RB#0	21.13	24.84
Band48	10M	QPSK	56290	1RB#0	23.09	26.80
Band48	10M	QPSK	56290	1RB#25	22.84	26.55
Band48	10M	QPSK	56290	1RB#49	23.60	27.31
Band48	10M	QPSK	56290	25RB#0	22.70	26.41
Band48	10M	QPSK	56290	25RB#13	22.65	26.36
Band48	10M	QPSK	56290	25RB#25	23.08	26.79
Band48	10M	QPSK	56290	50RB#0	22.93	26.64
Band48	10M	QPSK	56490	1RB#0	23.47	27.18
Band48	10M	QPSK	56490	1RB#25	23.50	27.21
Band48	10M	QPSK	56490	1RB#49	23.68	27.39
Band48	10M	QPSK	56490	25RB#0	23.31	27.02
Band48	10M	QPSK	56490	25RB#13	23.27	26.98
Band48	10M	QPSK	56490	25RB#25	23.50	27.21
Band48	10M	QPSK	56490	50RB#0	23.42	27.13
Band48	10M	QPSK	56690	1RB#0	23.87	27.58
Band48	10M	QPSK	56690	1RB#25	23.45	27.16
Band48	10M	QPSK	56690	1RB#49	22.90	26.61
Band48	10M	QPSK	56690	25RB#0	23.38	27.09
Band48	10M	QPSK	56690	25RB#13	23.34	27.05



Band48	10M	QPSK	56690	25RB#25	23.18	26.89
Band48	10M	QPSK	56690	50RB#0	23.31	27.02
Band48	10M	16QAM	56290	1RB#0	23.29	27.00
Band48	10M	16QAM	56290	1RB#25	22.99	26.70
Band48	10M	16QAM	56290	1RB#49	23.71	27.42
Band48	10M	16QAM	56290	25RB#0	22.76	26.47
Band48	10M	16QAM	56290	25RB#13	22.73	26.44
Band48	10M	16QAM	56290	25RB#25	22.90	26.61
Band48	10M	16QAM	56290	50RB#0	22.87	26.58
Band48	10M	16QAM	56490	1RB#0	23.51	27.22
Band48	10M	16QAM	56490	1RB#25	23.52	27.23
Band48	10M	16QAM	56490	1RB#49	23.73	27.44
Band48	10M	16QAM	56490	25RB#0	23.43	27.14
Band48	10M	16QAM	56490	25RB#13	23.38	27.09
Band48	10M	16QAM	56490	25RB#25	23.38	27.09
Band48	10M	16QAM	56490	50RB#0	23.46	27.17
Band48	10M	16QAM	56690	1RB#0	24.18	27.89
Band48	10M	16QAM	56690	1RB#25	23.68	27.39
Band48	10M	16QAM	56690	1RB#49	23.04	26.75
Band48	10M	16QAM	56690	25RB#0	23.32	27.03
Band48	10M	16QAM	56690	25RB#13	23.26	26.97
Band48	10M	16QAM	56690	25RB#25	23.18	26.89
Band48	10M	16QAM	56690	50RB#0	23.07	26.78
Band48	10M	64QAM	56290	1RB#0	21.81	25.52
Band48	10M	64QAM	56290	1RB#25	21.31	25.02
Band48	10M	64QAM	56290	1RB#49	22.39	26.10
Band48	10M	64QAM	56290	25RB#0	21.03	24.74
Band48	10M	64QAM	56290	25RB#13	21.09	24.80
Band48	10M	64QAM	56290	25RB#25	21.23	24.94
Band48	10M	64QAM	56290	50RB#0	21.08	24.79
Band48	10M	64QAM	56490	1RB#0	21.80	25.51
Band48	10M	64QAM	56490	1RB#25	21.66	25.37
Band48	10M	64QAM	56490	1RB#49	22.15	25.86
Band48	10M	64QAM	56490	25RB#0	21.38	25.09
Band48	10M	64QAM	56490	25RB#13	21.48	25.19
Band48	10M	64QAM	56490	25RB#25	21.59	25.30
Band48	10M	64QAM	56490	50RB#0	21.49	25.20
Band48	10M	64QAM	56690	1RB#0	22.54	26.25
Band48	10M	64QAM	56690	1RB#25	21.53	25.24
Band48	10M	64QAM	56690	1RB#49	21.38	25.09
Band48	10M	64QAM	56690	25RB#0	21.59	25.30
Band48	10M	64QAM	56690	25RB#13	21.40	25.11
Band48	10M	64QAM	56690	25RB#25	20.90	24.61



Band48	10M	64QAM	56690	50RB#0	21.11	24.82
Band48	15M	QPSK	56315	1RB#0	23.08	26.79
Band48	15M	QPSK	56315	1RB#38	22.82	26.53
Band48	15M	QPSK	56315	1RB#74	23.57	27.28
Band48	15M	QPSK	56315	36RB#0	22.68	26.39
Band48	15M	QPSK	56315	36RB#18	22.62	26.33
Band48	15M	QPSK	56315	36RB#39	23.05	26.76
Band48	15M	QPSK	56315	75RB#0	22.91	26.62
Band48	15M	QPSK	56490	1RB#0	23.43	27.14
Band48	15M	QPSK	56490	1RB#38	23.49	27.20
Band48	15M	QPSK	56490	1RB#74	23.63	27.34
Band48	15M	QPSK	56490	36RB#0	23.27	26.98
Band48	15M	QPSK	56490	36RB#18	23.22	26.93
Band48	15M	QPSK	56490	36RB#39	23.47	27.18
Band48	15M	QPSK	56490	75RB#0	23.38	27.09
Band48	15M	QPSK	56665	1RB#0	23.85	27.56
Band48	15M	QPSK	56665	1RB#38	23.42	27.13
Band48	15M	QPSK	56665	1RB#74	22.86	26.57
Band48	15M	QPSK	56665	36RB#0	23.35	27.06
Band48	15M	QPSK	56665	36RB#18	23.30	27.01
Band48	15M	QPSK	56665	36RB#39	23.14	26.85
Band48	15M	QPSK	56665	75RB#0	23.26	26.97
Band48	15M	16QAM	56315	1RB#0	23.24	26.95
Band48	15M	16QAM	56315	1RB#38	22.97	26.68
Band48	15M	16QAM	56315	1RB#74	23.68	27.39
Band48	15M	16QAM	56315	36RB#0	22.73	26.44
Band48	15M	16QAM	56315	36RB#18	22.70	26.41
Band48	15M	16QAM	56315	36RB#39	22.88	26.59
Band48	15M	16QAM	56315	75RB#0	22.84	26.55
Band48	15M	16QAM	56490	1RB#0	23.49	27.20
Band48	15M	16QAM	56490	1RB#38	23.49	27.20
Band48	15M	16QAM	56490	1RB#74	23.69	27.40
Band48	15M	16QAM	56490	36RB#0	23.41	27.12
Band48	15M	16QAM	56490	36RB#18	23.33	27.04
Band48	15M	16QAM	56490	36RB#39	23.34	27.05
Band48	15M	16QAM	56490	75RB#0	23.41	27.12
Band48	15M	16QAM	56665	1RB#0	24.16	27.87
Band48	15M	16QAM	56665	1RB#38	23.66	27.37
Band48	15M	16QAM	56665	1RB#74	23.01	26.72
Band48	15M	16QAM	56665	36RB#0	23.29	27.00
Band48	15M	16QAM	56665	36RB#18	23.22	26.93
Band48	15M	16QAM	56665	36RB#39	23.15	26.86
Band48	15M	16QAM	56665	75RB#0	23.00	26.71



Band48	15M	64QAM	56315	1RB#0	21.76	25.47
Band48	15M	64QAM	56315	1RB#38	21.29	25.00
Band48	15M	64QAM	56315	1RB#74	22.36	26.07
Band48	15M	64QAM	56315	36RB#0	21.00	24.71
Band48	15M	64QAM	56315	36RB#18	21.06	24.77
Band48	15M	64QAM	56315	36RB#39	21.21	24.92
Band48	15M	64QAM	56315	75RB#0	21.05	24.76
Band48	15M	64QAM	56490	1RB#0	21.78	25.49
Band48	15M	64QAM	56490	1RB#38	21.63	25.34
Band48	15M	64QAM	56490	1RB#74	22.11	25.82
Band48	15M	64QAM	56490	36RB#0	21.36	25.07
Band48	15M	64QAM	56490	36RB#18	21.43	25.14
Band48	15M	64QAM	56490	36RB#39	21.55	25.26
Band48	15M	64QAM	56490	75RB#0	21.44	25.15
Band48	15M	64QAM	56665	1RB#0	22.52	26.23
Band48	15M	64QAM	56665	1RB#38	21.51	25.22
Band48	15M	64QAM	56665	1RB#74	21.35	25.06
Band48	15M	64QAM	56665	36RB#0	21.56	25.27
Band48	15M	64QAM	56665	36RB#18	21.36	25.07
Band48	15M	64QAM	56665	36RB#39	20.87	24.58
Band48	15M	64QAM	56665	75RB#0	21.07	24.78
Band48	20M	QPSK	56340	1RB#0	23.05	26.76
Band48	20M	QPSK	56340	1RB#50	22.81	26.52
Band48	20M	QPSK	56340	1RB#99	23.55	27.26
Band48	20M	QPSK	56340	50RB#0	22.65	26.36
Band48	20M	QPSK	56340	50RB#25	22.60	26.31
Band48	20M	QPSK	56340	50RB#50	23.02	26.73
Band48	20M	QPSK	56340	100RB#0	22.88	26.59
Band48	20M	QPSK	56490	1RB#0	23.39	27.10
Band48	20M	QPSK	56490	1RB#50	23.45	27.16
Band48	20M	QPSK	56490	1RB#99	23.62	27.33
Band48	20M	QPSK	56490	50RB#0	23.22	26.93
Band48	20M	QPSK	56490	50RB#25	23.18	26.89
Band48	20M	QPSK	56490	50RB#50	23.42	27.13
Band48	20M	QPSK	56490	100RB#0	23.33	27.04
Band48	20M	QPSK	56640	1RB#0	23.82	27.53
Band48	20M	QPSK	56640	1RB#50	23.40	27.11
Band48	20M	QPSK	56640	1RB#99	22.83	26.54
Band48	20M	QPSK	56640	50RB#0	23.31	27.02
Band48	20M	QPSK	56640	50RB#25	23.27	26.98
Band48	20M	QPSK	56640	50RB#50	23.10	26.81
Band48	20M	QPSK	56640	100RB#0	23.22	26.93
Band48	20M	16QAM	56340	1RB#0	23.22	26.93



Band48	20M	16QAM	56340	1RB#50	22.93	26.64
Band48	20M	16QAM	56340	1RB#99	23.66	27.37
Band48	20M	16QAM	56340	50RB#0	22.70	26.41
Band48	20M	16QAM	56340	50RB#25	22.67	26.38
Band48	20M	16QAM	56340	50RB#50	22.85	26.56
Band48	20M	16QAM	56340	100RB#0	22.82	26.53
Band48	20M	16QAM	56490	1RB#0	23.45	27.16
Band48	20M	16QAM	56490	1RB#50	23.47	27.18
Band48	20M	16QAM	56490	1RB#99	23.66	27.37
Band48	20M	16QAM	56490	50RB#0	23.37	27.08
Band48	20M	16QAM	56490	50RB#25	23.31	27.02
Band48	20M	16QAM	56490	50RB#50	23.29	27.00
Band48	20M	16QAM	56490	100RB#0	23.37	27.08
Band48	20M	16QAM	56640	1RB#0	24.11	27.82
Band48	20M	16QAM	56640	1RB#50	23.62	27.33
Band48	20M	16QAM	56640	1RB#99	22.99	26.70
Band48	20M	16QAM	56640	50RB#0	23.26	26.97
Band48	20M	16QAM	56640	50RB#25	23.19	26.90
Band48	20M	16QAM	56640	50RB#50	23.11	26.82
Band48	20M	16QAM	56640	100RB#0	23.00	26.71
Band48	20M	64QAM	56340	1RB#0	21.74	25.45
Band48	20M	64QAM	56340	1RB#50	21.25	24.96
Band48	20M	64QAM	56340	1RB#99	22.34	26.05
Band48	20M	64QAM	56340	50RB#0	20.97	24.68
Band48	20M	64QAM	56340	50RB#25	21.03	24.74
Band48	20M	64QAM	56340	50RB#50	21.18	24.89
Band48	20M	64QAM	56340	100RB#0	21.03	24.74
Band48	20M	64QAM	56490	1RB#0	21.74	25.45
Band48	20M	64QAM	56490	1RB#50	21.61	25.32
Band48	20M	64QAM	56490	1RB#99	22.08	25.79
Band48	20M	64QAM	56490	50RB#0	21.32	25.03
Band48	20M	64QAM	56490	50RB#25	21.41	25.12
Band48	20M	64QAM	56490	50RB#50	21.50	25.21
Band48	20M	64QAM	56490	100RB#0	21.40	25.11
Band48	20M	64QAM	56640	1RB#0	22.47	26.18
Band48	20M	64QAM	56640	1RB#50	21.47	25.18
Band48	20M	64QAM	56640	1RB#99	21.33	25.04
Band48	20M	64QAM	56640	50RB#0	21.53	25.24
Band48	20M	64QAM	56640	50RB#25	21.33	25.04
Band48	20M	64QAM	56640	50RB#50	20.83	24.54
Band48	20M	64QAM	56640	100RB#0	21.04	24.75

5.2. Occupied Bandwidth

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

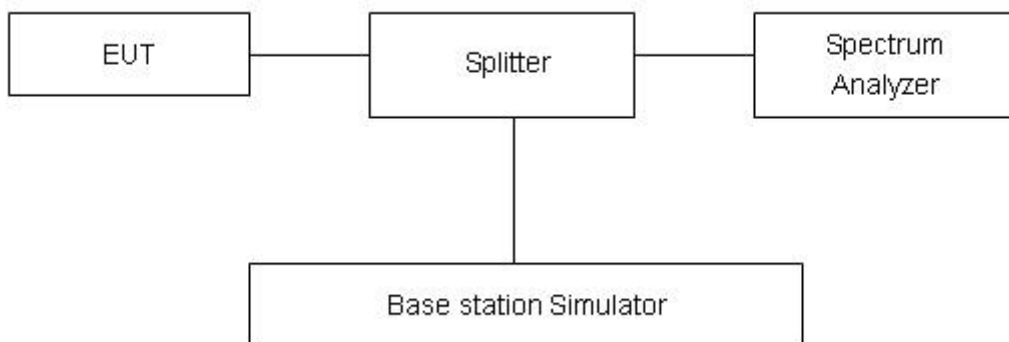
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 43 (5MHz),

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 43 (10MHz/15MHz/20MHz).

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=624\text{Hz}$.



Test Result

LTE Band 48						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth (MHz)
100%	QPSK	5	56265	3652.5	4.5471	5.271
			56490	3675	4.5375	5.159
			56715	3697.5	4.5164	5.077
		10	56290	3655	9.0801	9.950
			56490	3675	9.0633	9.990
			56690	3695	9.0756	10.080
		15	56315	3657.5	13.4920	14.590
			56490	3675	13.4420	14.650
			56665	2692.5	13.4800	14.270
		20	56340	3660	17.8420	18.950
			56490	3675	17.8650	18.730
			56640	3690	17.8920	18.670
	16QAM	5	56265	3652.5	4.5180	5.182
			56490	3675	4.5133	5.277
			56715	3697.5	4.5134	5.240
		10	56290	3655	9.0339	10.310
			56490	3675	9.0434	10.020
			56690	3695	9.0538	10.030
		15	56315	3657.5	13.4310	14.290
			56490	3675	13.4790	14.580
			56665	2692.5	13.5010	14.540
		20	56340	3660	17.8190	19.060
			56490	3675	17.8920	19.020
			56640	3690	17.8890	19.070
	64QAM	5	56265	3652.5	4.5175	5.225
			56490	3675	4.5154	5.101
			56715	3697.5	4.5170	5.225
		10	56290	3655	9.0403	9.947
			56490	3675	9.0273	9.887
			56690	3695	9.0400	10.010



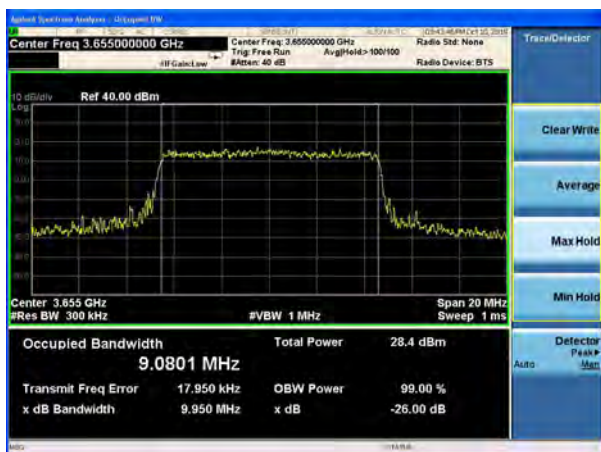
		15	56315	3657.5	13.4540	14.640
			56490	3675	13.4250	14.680
			56665	2692.5	13.4670	14.430
		20	56340	3660	17.8700	18.850
			56490	3675	17.8970	18.830
			56640	3690	17.8670	19.060



LTE Band 48 QPSK 5MHz CH-Low



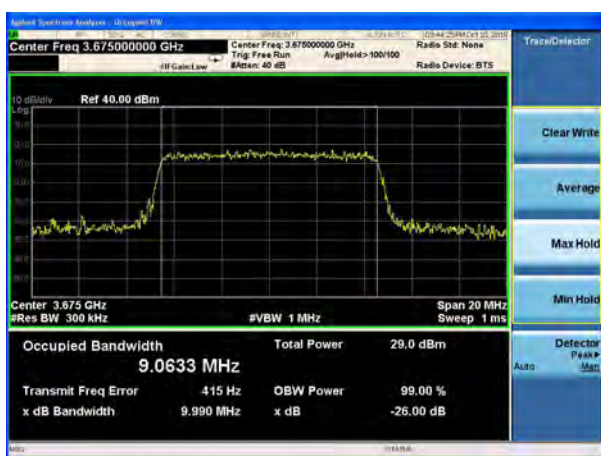
LTE Band 48 QPSK 10MHz CH-Low



LTE Band 48 QPSK 5MHz CH-Middle



LTE Band 48 QPSK 10MHz CH-Middle



LTE Band 48 QPSK 5MHz CH-High



LTE Band 48 QPSK 10MHz CH-High



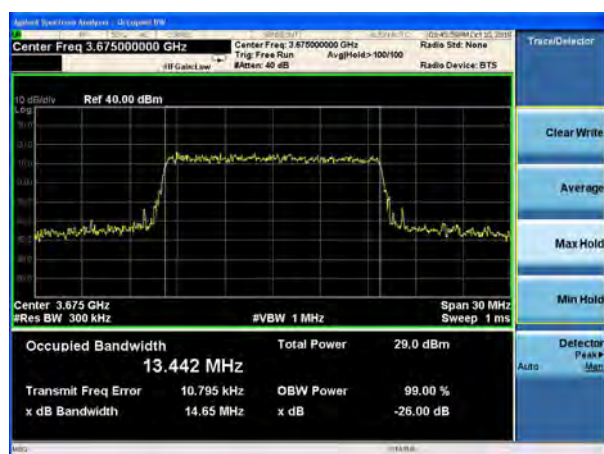
LTE Band 48 QPSK 15MHz CH-Low



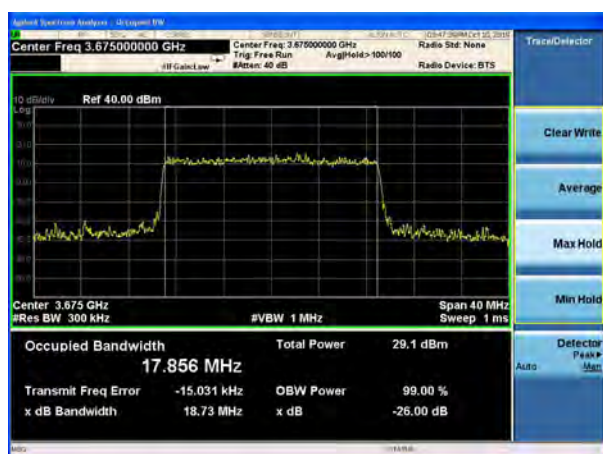
LTE Band 48 QPSK 20MHz CH-Low



LTE Band 48 QPSK 15MHz CH-Middle



LTE Band 48 QPSK 20MHz CH-Middle



LTE Band 48 QPSK 15MHz CH-High



LTE Band 48 QPSK 20MHz CH-High

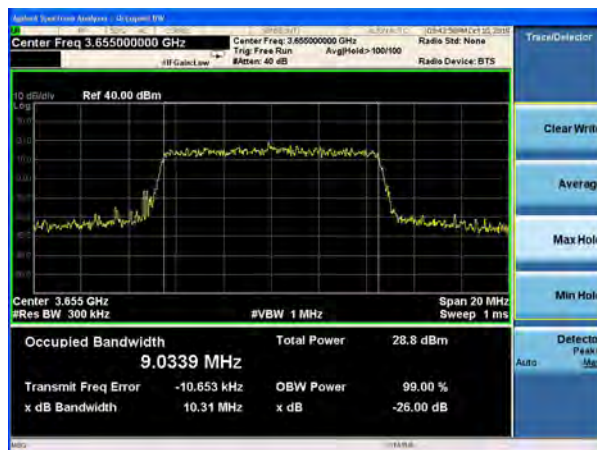




LTE Band 48 16QAM 5MHz CH-Low



LTE Band 48 16QAM 10MHz CH-Low



LTE Band 48 16QAM 5MHz CH-Middle



LTE Band 48 16QAM 10MHz CH-Middle



LTE Band 48 16QAM 5MHz CH-High

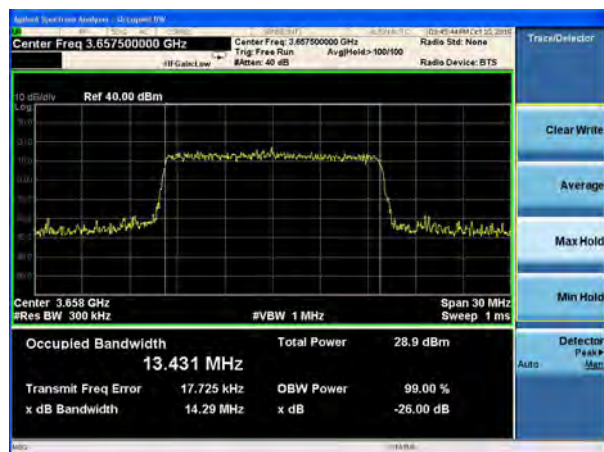


LTE Band 48 16QAM 10MHz CH-High

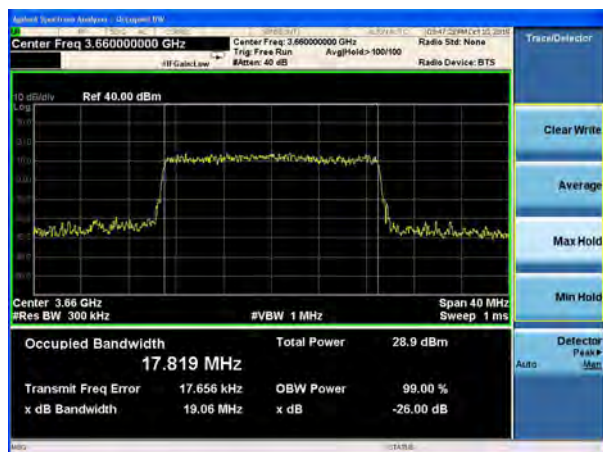




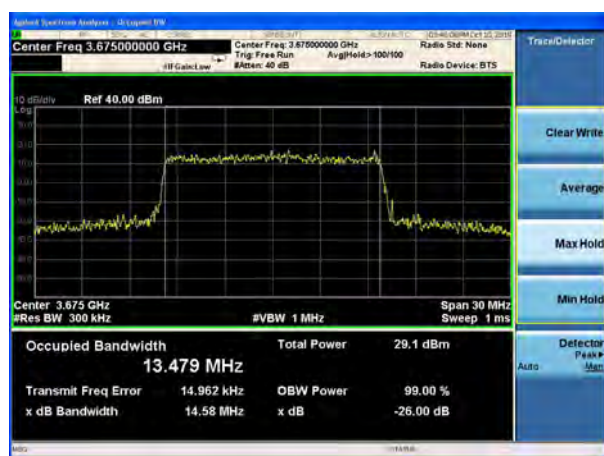
LTE Band 48 16QAM 15MHz CH-Low



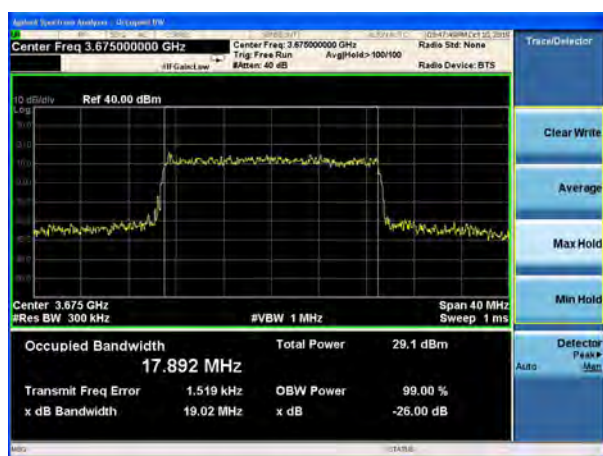
LTE Band 48 16QAM 20MHz CH-Low



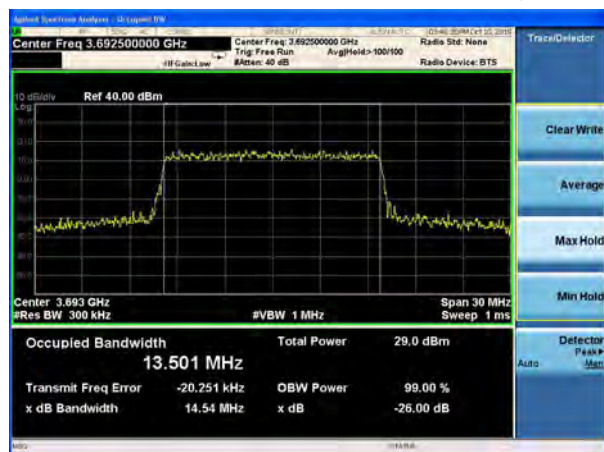
LTE Band 48 16QAM 15MHz CH-Middle



LTE Band 48 16QAM 20MHz CH-Middle



LTE Band 48 16QAM 15MHz CH-High

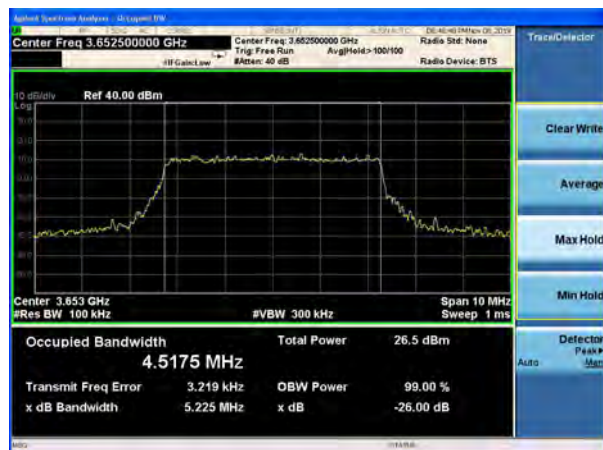


LTE Band 48 16QAM 20MHz CH-High

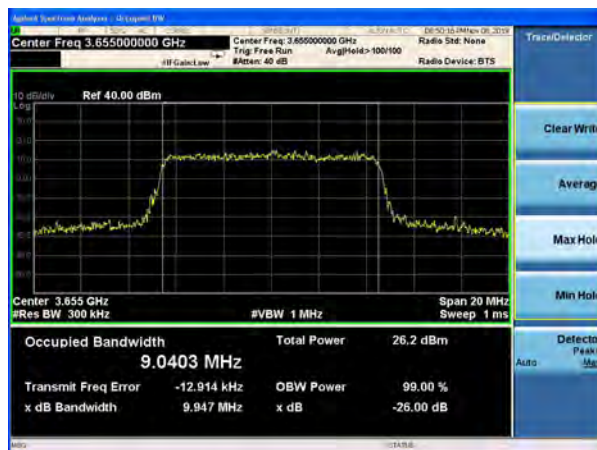




LTE Band 48 64QAM 5MHz CH-Low



LTE Band 48 64QAM 10MHz CH-Low



LTE Band 48 64QAM 5MHz CH-Middle



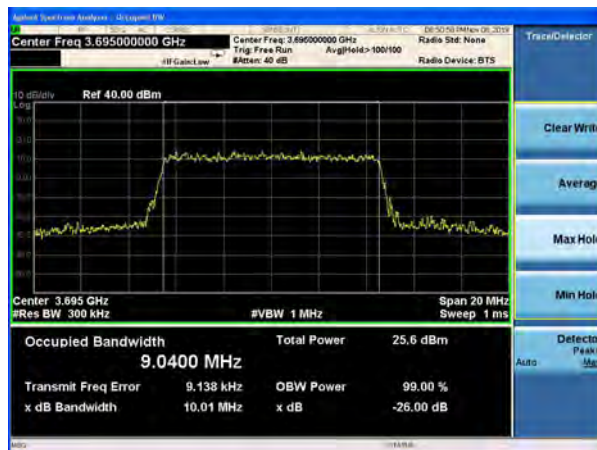
LTE Band 48 64QAM 10MHz CH-Middle



LTE Band 48 64QAM 5MHz CH-High

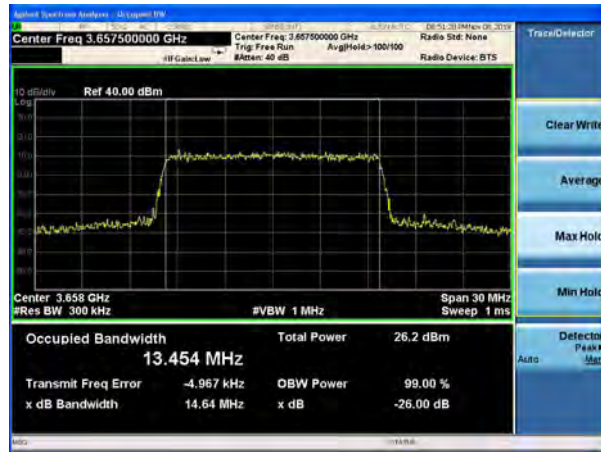


LTE Band 48 64QAM 10MHz CH-High





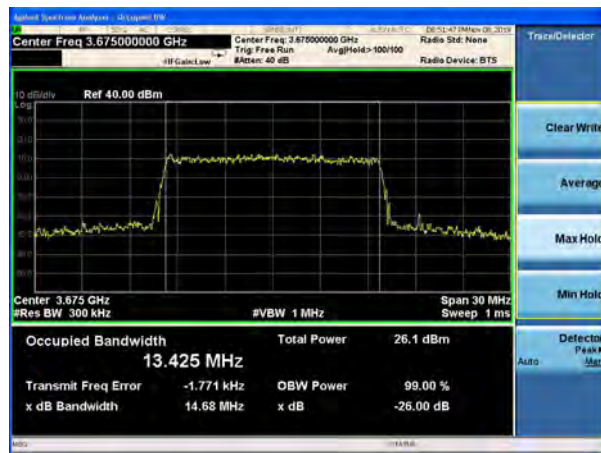
LTE Band 48 64QAM 15MHz CH-Low



LTE Band 48 64QAM 20MHz CH-Low



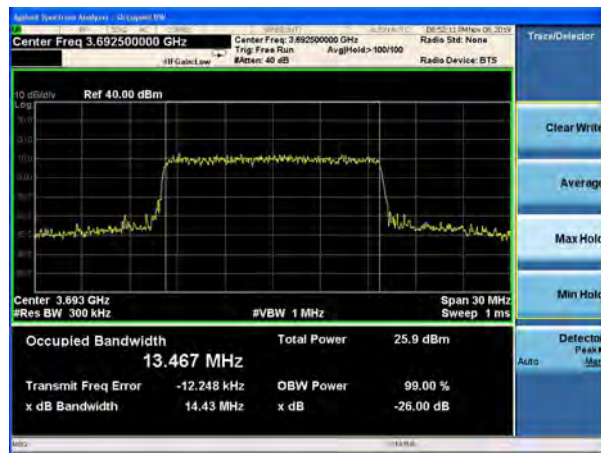
LTE Band 48 64QAM 15MHz CH-Middle



LTE Band 48 64QAM 20MHz CH-Middle



LTE Band 48 64QAM 15MHz CH-High



LTE Band 48 64QAM 20MHz CH-High



5.3. Emission Mask

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used.

RBW is set to 51kHz, VBW is set to 100kHz for 5MHz, .

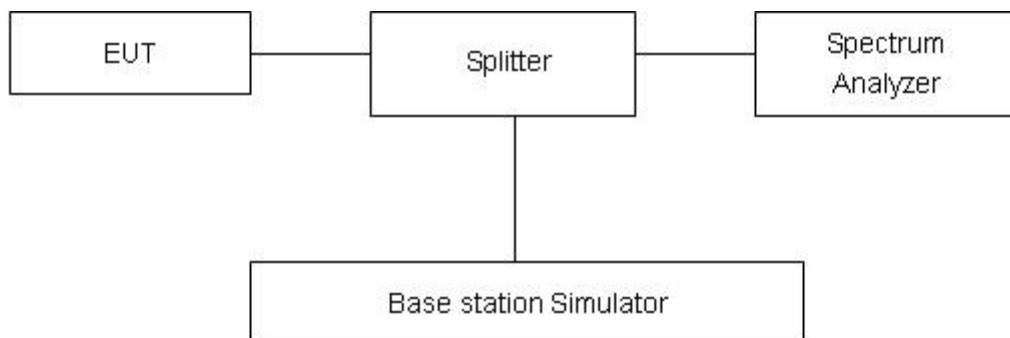
RBW is set to 100kHz, VBW is set to 300kHz for 10MHz,

RBW is set to 150kHz, VBW is set to 510kHz for 15MHz,

RBW is set to 200kHz, VBW is set to 620kHz for 20MHz.

Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 90.210(b) For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB.

Rule Part 90.1323(a) The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684$ dB.



Test Result:

LTE Band 48 5MHz QPSK 1RB CH-Low



LTE Band 48 5MHz QPSK 1RB CH-High



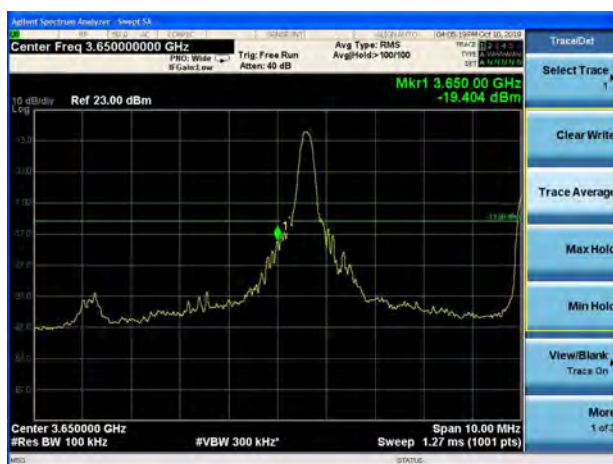
LTE Band 48 5MHz QPSK 100%RB CH-Low



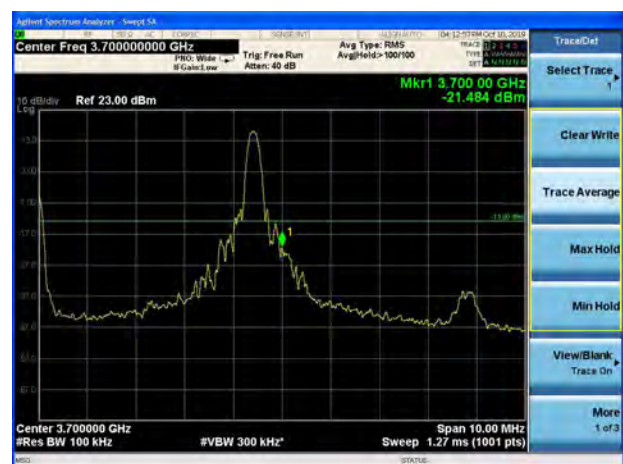
LTE Band 48 5MHz QPSK 100%RB CH-High



LTE Band 48 10MHz QPSK 1RB CH-Low



LTE Band 48 10MHz QPSK 1RB CH-High





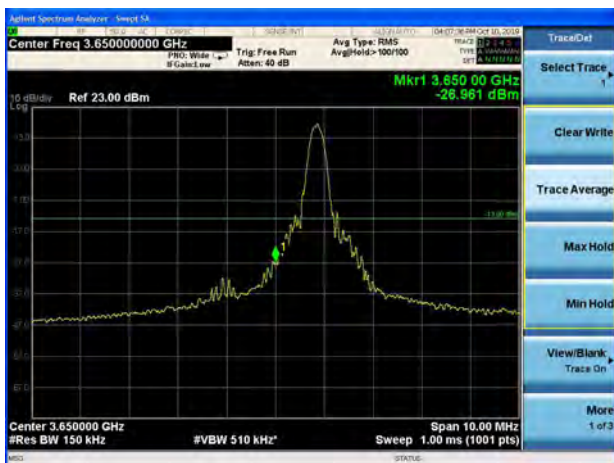
LTE Band 48 10MHz QPSK 100%RB CH-Low



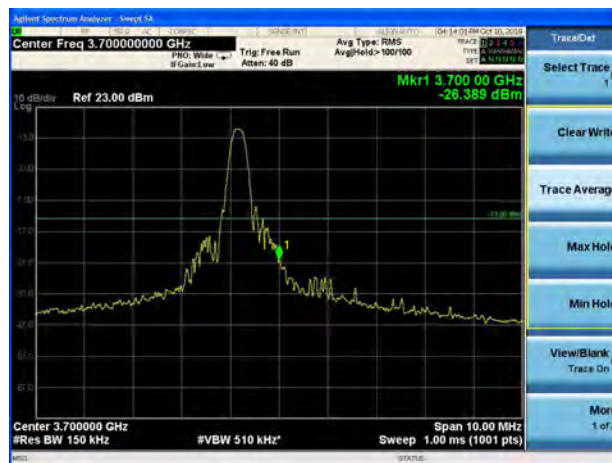
LTE Band 48 10MHz QPSK 100%RB CH-High



LTE Band 48 15MHz QPSK 1RB CH-Low



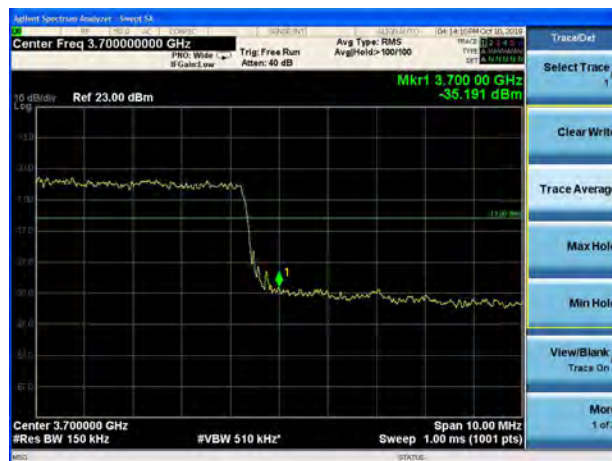
LTE Band 48 15MHz QPSK 1RB CH-High



LTE Band 48 15MHz QPSK 100%RB CH-Low

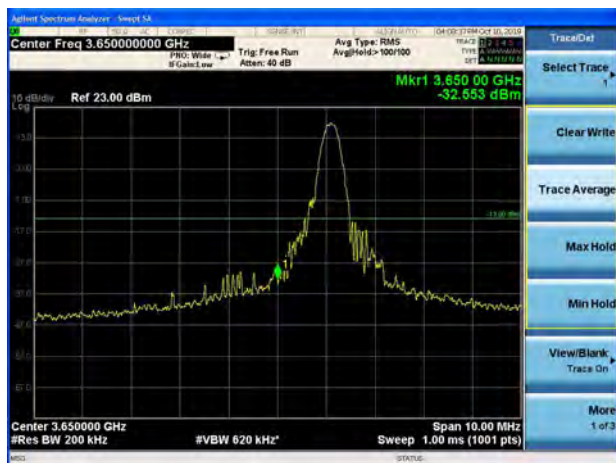


LTE Band 48 15MHz QPSK 100%RB CH-High

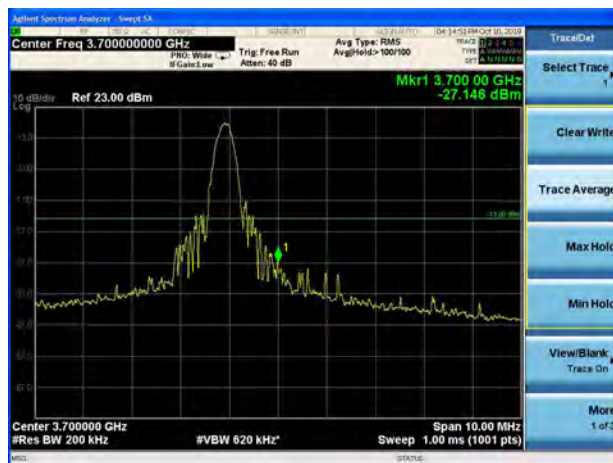




LTE Band 48 20MHz QPSK 1RB CH-Low



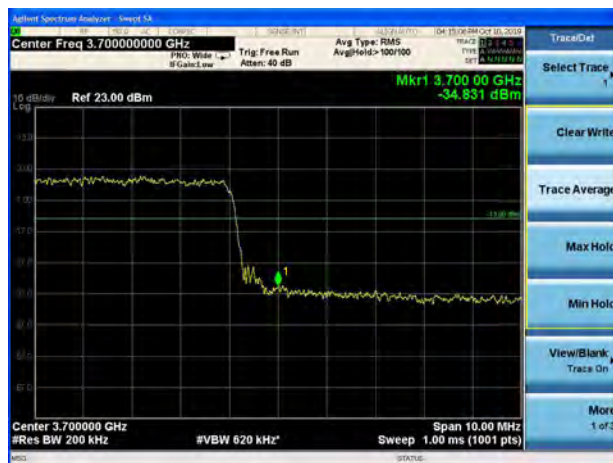
LTE Band 48 20MHz QPSK 1RB CH-High



LTE Band 48 20MHz QPSK 100%RB CH-Low



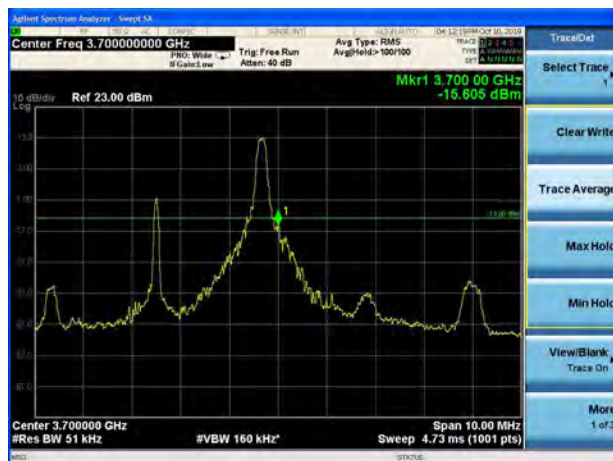
LTE Band 48 20MHz QPSK 100%RB CH-High



LTE Band 48 5MHz 16QAM 1RB CH-Low



LTE Band 48 5MHz 16QAM 1RB CH-High

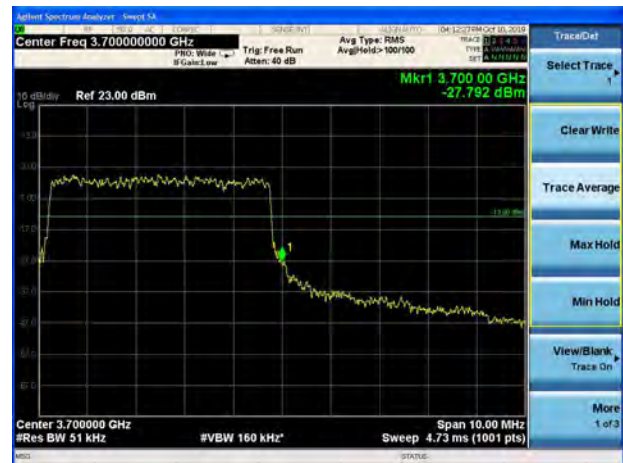




LTE Band 48 5MHz 16QAM 100%RB CH-Low



LTE Band 48 5MHz 16QAM 100%RB CH-High



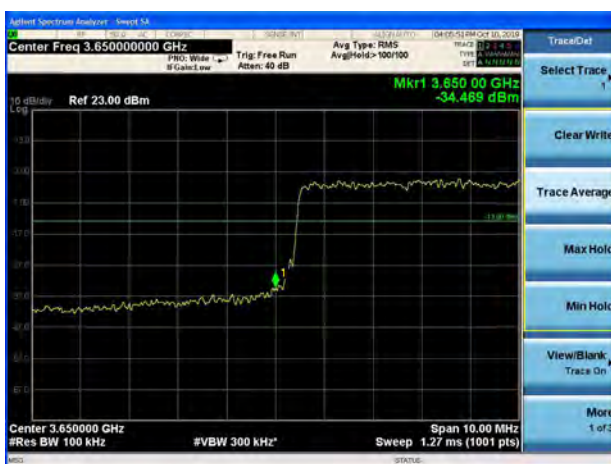
LTE Band 48 10MHz 16QAM 1RB CH-Low



LTE Band 48 10MHz 16QAM 1RB CH-High



LTE Band 48 10MHz 16QAM 100%RB CH-Low



LTE Band 48 10MHz 16QAM 100%RB CH-High

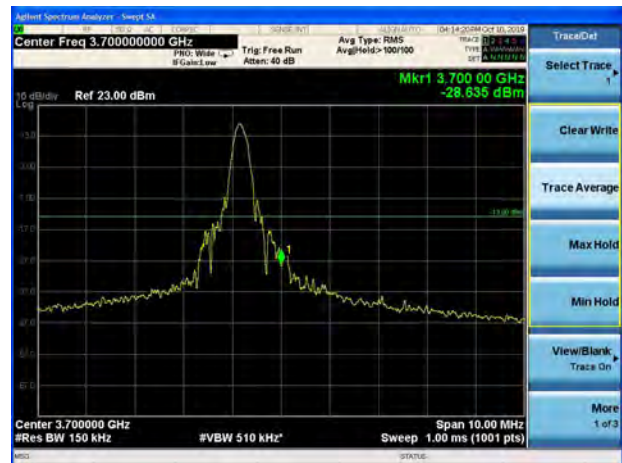




LTE Band 48 15MHz 16QAM 1RB CH-Low



LTE Band 48 15MHz 16QAM 1RB CH-High



LTE Band 48 15MHz 16QAM 100%RB CH-Low



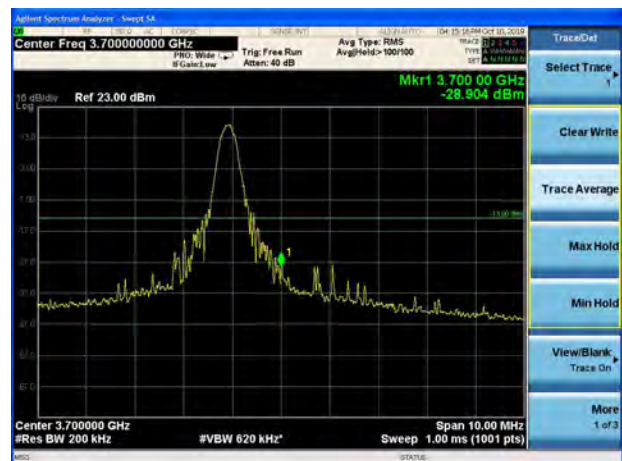
LTE Band 48 15MHz 16QAM 100%RB CH-High



LTE Band 48 20MHz 16QAM 1RB CH-Low



LTE Band 48 20MHz 16QAM 1RB CH-High

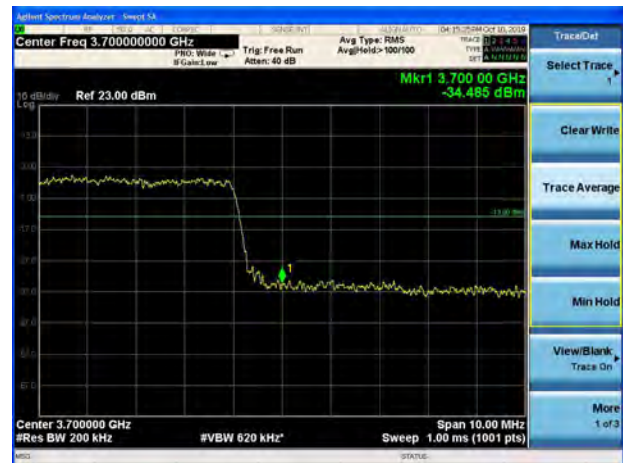




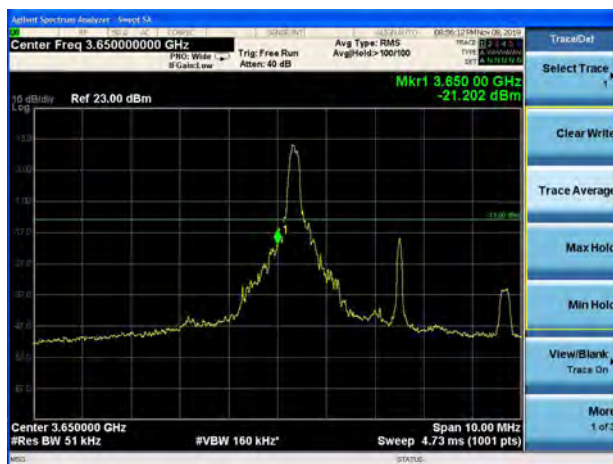
LTE Band 48 20MHz 16QAM 100%RB CH-Low



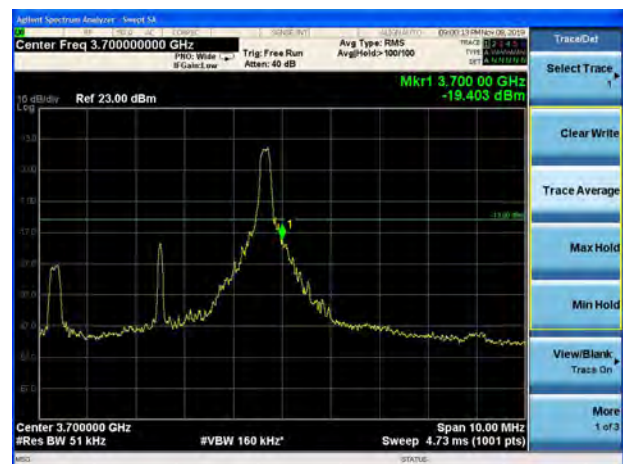
LTE Band 48 20MHz 16QAM 100%RB CH-High



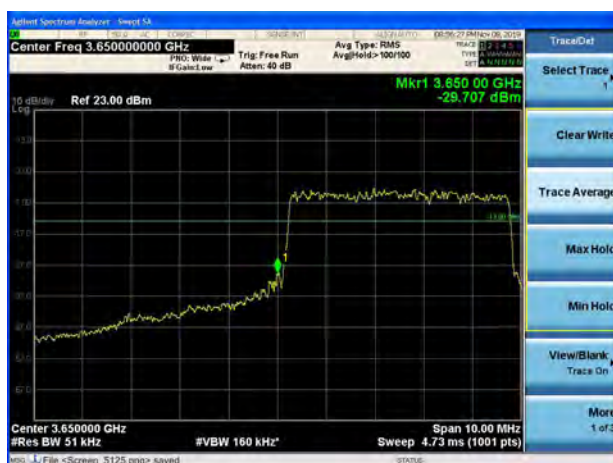
LTE Band 48 64QAM 5MHz CH-Low 1RB



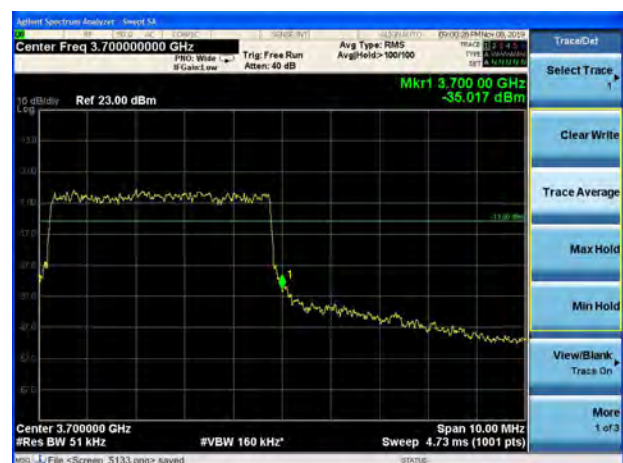
LTE Band 48 64QAM 5MHz CH-High 1RB



LTE Band 48 64QAM 5MHz CH-Low 100%RB

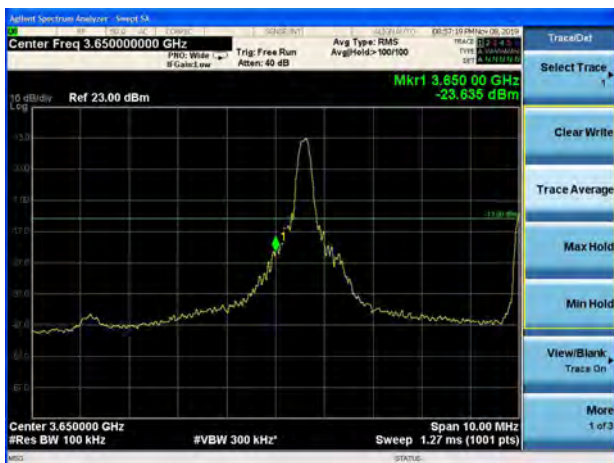


LTE Band 48 64QAM 5MHz CH-High 100%RB





LTE Band 48 64QAM 10MHz CH-Low 1RB



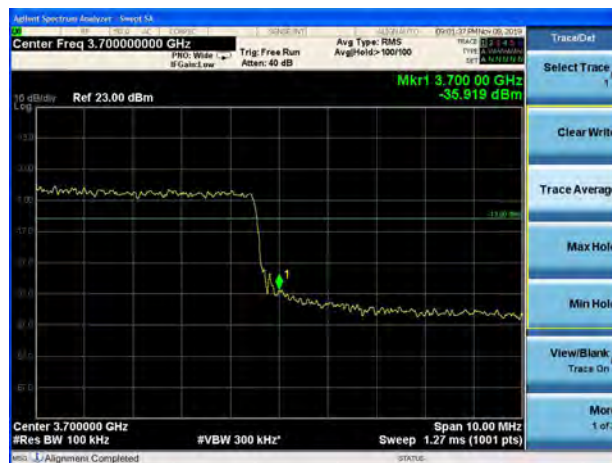
LTE Band 48 64QAM 10MHz CH-High 1RB



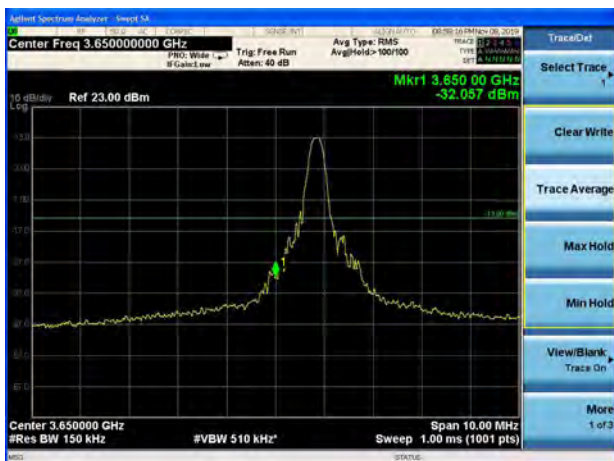
LTE Band 48 64QAM 10MHz CH-Low 100%RB



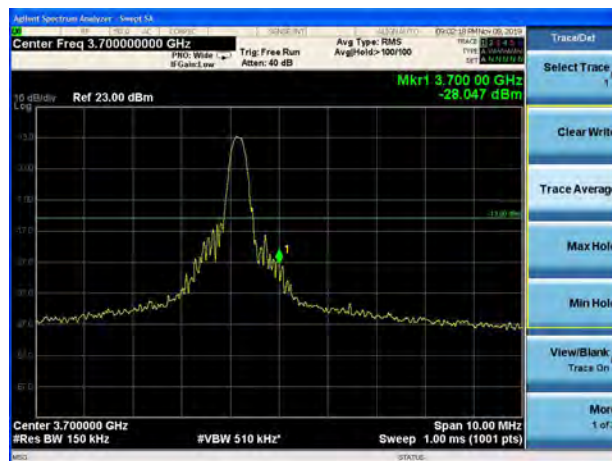
LTE Band 48 64QAM 10MHz CH-High 100%RB



LTE Band 48 64QAM 15MHz CH-Low 1RB



LTE Band 48 64QAM 15MHz CH-High 1RB



LTE Band 48 64QAM 15MHz CH-Low 100%RB

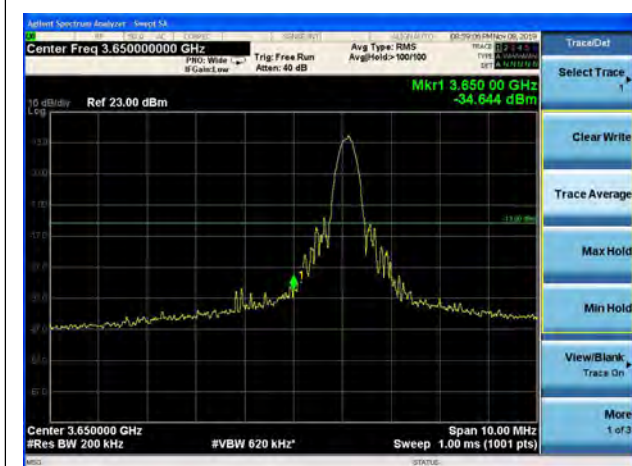
LTE Band 48 64QAM 15MHz CH-High 100%RB



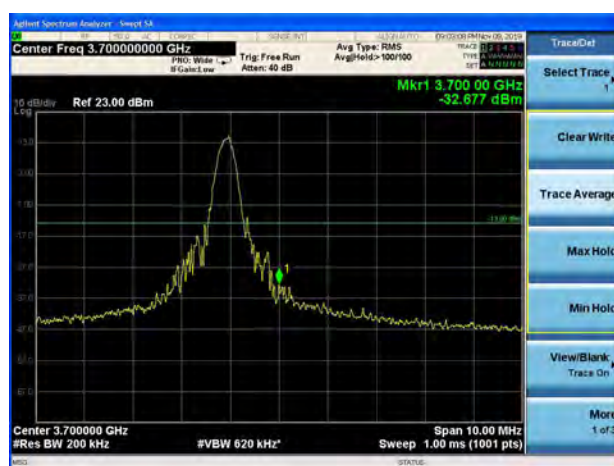
LTE Band 48 64QAM 20MHz CH-Low 1RB



LTE Band 48 64QAM 20MHz CH-High 1RB



LTE Band 48 64QAM 20MHz CH-Low 100%RB



LTE Band 48 64QAM 20MHz CH-High 100%RB



5.4. Frequency Stability

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +70°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +70°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

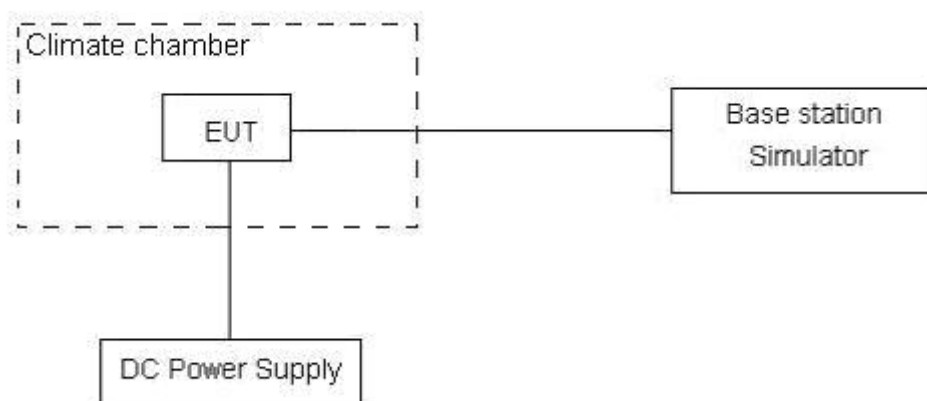
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3V and 3.6V, with a nominal voltage of 3.3V.

Test setup



**Limits**

Requirements: FCC § 2.1055 (a)(d), The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3$, $U = 0.01$ ppm.



Test Result

LTE Band 48								
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	5.99	14.74	15.55	0.00319	0.00784	0.00827	PASS
Extreme (70℃)		9.60	11.26	12.95	0.00511	0.00599	0.00689	PASS
Extreme (60℃)		4.14	15.60	13.54	0.00220	0.00830	0.00720	PASS
Extreme (50℃)		2.77	3.77	13.47	0.00148	0.00201	0.00717	PASS
Extreme (40℃)		9.30	12.62	5.97	0.00495	0.00671	0.00318	PASS
Extreme (30℃)		3.55	10.03	17.43	0.00189	0.00534	0.00927	PASS
Extreme (20℃)		12.67	8.48	1.18	0.00674	0.00451	0.00063	PASS
Extreme (10℃)		2.58	3.59	5.46	0.00137	0.00191	0.00291	PASS
Extreme (0℃)		10.05	4.66	8.49	0.00534	0.00248	0.00452	PASS
Extreme (-10℃)		11.05	13.94	2.83	0.00588	0.00742	0.00150	PASS
Extreme (-20℃)		6.65	16.52	14.34	0.00354	0.00879	0.00763	PASS
Extreme (-30℃)		11.13	10.32	7.64	0.00592	0.00549	0.00406	PASS
Extreme (-40℃)		12.36	10.78	3.62	0.00657	0.00573	0.00193	PASS
25℃	LV	3.02	8.38	15.25	0.00161	0.00446	0.00811	PASS
	HV	2.74	16.59	7.92	0.00146	0.00883	0.00421	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Normal (25℃)	Normal	8.64	12.07	6.23	0.00459	0.00642	0.00331	PASS
Extreme (70℃)		6.93	11.45	3.25	0.00369	0.00609	0.00173	PASS
Extreme (60℃)		2.41	1.25	6.29	0.00128	0.00067	0.00335	PASS
Extreme (50℃)		7.66	14.13	17.68	0.00407	0.00751	0.00940	PASS
Extreme (40℃)		5.55	12.66	1.95	0.00295	0.00673	0.00104	PASS
Extreme (30℃)		16.38	11.06	13.99	0.00871	0.00588	0.00744	PASS
Extreme (20℃)		16.97	11.24	16.11	0.00903	0.00598	0.00857	PASS
Extreme (10℃)		11.47	13.97	15.53	0.00610	0.00743	0.00826	PASS
Extreme (0℃)		12.80	8.90	8.73	0.00681	0.00473	0.00464	PASS
Extreme (-10℃)		16.90	9.18	1.57	0.00899	0.00488	0.00083	PASS
Extreme (-20℃)		1.86	6.24	8.25	0.00099	0.00332	0.00439	PASS
Extreme (-30℃)		14.28	16.68	2.34	0.00759	0.00887	0.00124	PASS
Extreme (-40℃)		8.78	13.93	5.38	0.00467	0.00741	0.00286	PASS
25℃	LV	10.55	1.49	16.15	0.00561	0.00079	0.00859	PASS
	HV	8.87	15.84	10.72	0.00472	0.00843	0.00570	PASS



Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Temperature	Voltage							
Normal (25℃)	Normal	14.02	2.23	2.79	0.00746	0.00119	0.00149	PASS
Extreme (70℃)		3.25	6.33	3.50	0.00173	0.00337	0.00186	PASS
Extreme (60℃)		15.76	10.68	11.46	0.00838	0.00568	0.00609	PASS
Extreme (50℃)		11.78	12.61	6.87	0.00626	0.00671	0.00366	PASS
Extreme (40℃)		3.91	1.93	6.91	0.00208	0.00103	0.00368	PASS
Extreme (30℃)		11.94	15.18	15.12	0.00635	0.00807	0.00804	PASS
Extreme (20℃)		15.73	17.40	7.59	0.00837	0.00925	0.00404	PASS
Extreme (10℃)		11.67	9.20	17.50	0.00621	0.00489	0.00931	PASS
Extreme (0℃)		5.66	1.09	1.80	0.00301	0.00058	0.00096	PASS
Extreme (-10℃)		16.12	1.99	11.49	0.00857	0.00106	0.00611	PASS
Extreme (-20℃)		7.90	1.33	9.57	0.00420	0.00071	0.00509	PASS
Extreme (-30℃)		9.93	2.38	2.85	0.00528	0.00126	0.00151	PASS
Extreme (-40℃)		1.91	8.00	11.55	0.00102	0.00426	0.00615	PASS
25℃	LV	17.23	15.32	10.71	0.00917	0.00815	0.00570	PASS
	HV	5.85	14.21	7.59	0.00311	0.00756	0.00403	PASS
Condition		Freq. Error (Hz)	Freq. Error (Hz)	Freq. Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz	16QAM	QPSK	64QAM	16QAM	QPSK	64QAM	
Temperature	Voltage							
Normal (25℃)	Normal	16.88	14.04	15.91	0.00898	0.00747	0.00846	PASS
Extreme (70℃)		5.83	6.60	11.59	0.00310	0.00351	0.00617	PASS
Extreme (60℃)		6.54	2.60	2.28	0.00348	0.00138	0.00121	PASS
Extreme (50℃)		12.32	5.83	10.12	0.00655	0.00310	0.00538	PASS
Extreme (40℃)		13.57	3.56	1.51	0.00722	0.00189	0.00080	PASS
Extreme (30℃)		4.55	4.37	6.43	0.00242	0.00232	0.00342	PASS
Extreme (20℃)		3.45	17.71	11.64	0.00184	0.00942	0.00619	PASS
Extreme (10℃)		5.30	16.45	14.84	0.00282	0.00875	0.00789	PASS
Extreme (0℃)		6.87	7.95	9.99	0.00366	0.00423	0.00531	PASS
Extreme (-10℃)		7.02	11.91	14.62	0.00374	0.00634	0.00778	PASS
Extreme (-20℃)		6.02	7.17	13.41	0.00320	0.00381	0.00713	PASS
Extreme (-30℃)		17.00	16.87	13.54	0.00904	0.00897	0.00720	PASS
Extreme (-40℃)		1.36	1.45	10.52	0.00072	0.00077	0.00559	PASS
25℃	LV	15.51	17.87	6.12	0.00825	0.00950	0.00326	PASS
	HV	8.13	17.96	1.85	0.00432	0.00955	0.00098	PASS

5.5. Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

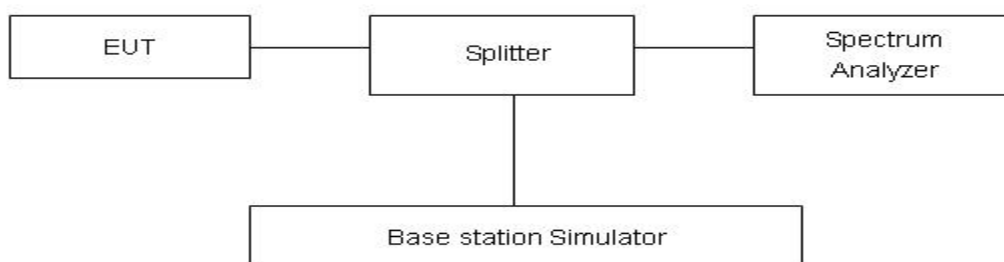
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW =1MHz, VBW=3MHz for 9kHz-1GHz;

RBW =1MHz, VBW=3MHz for above 1GHz; Sweep is set to ATUO.

Test setup



Limits

Rule Part 2.1051&90.1323 specifies that “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.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

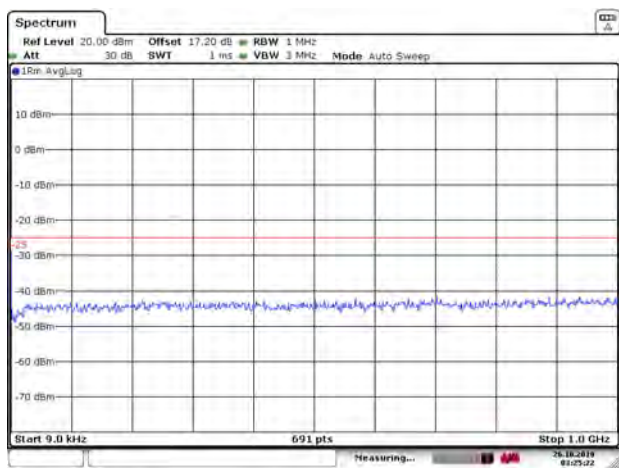
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-3GHz	1.407 dB
3GHz-40GHz	1.815 dB

**Test Result:**

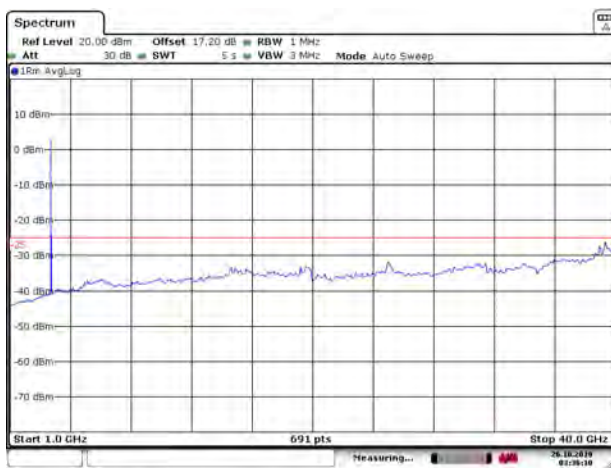
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier in the following plots.

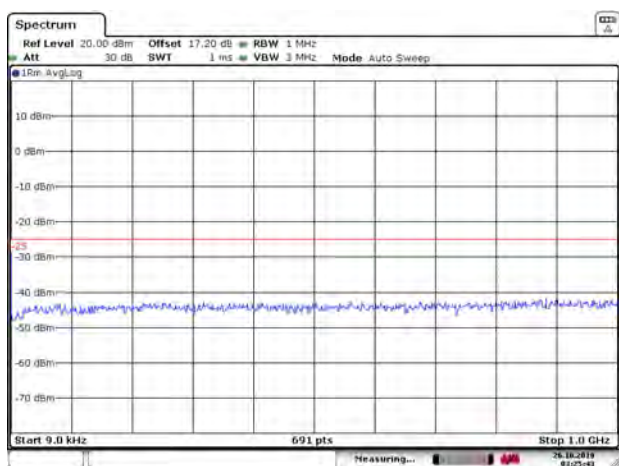
LTE Band 48 5MHz CH-Low 9kHz~1GHz



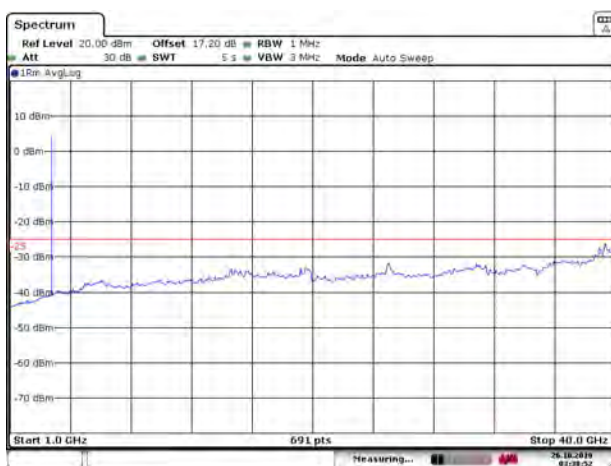
LTE Band 48 5MHz CH-Low 1GHz~40GHz



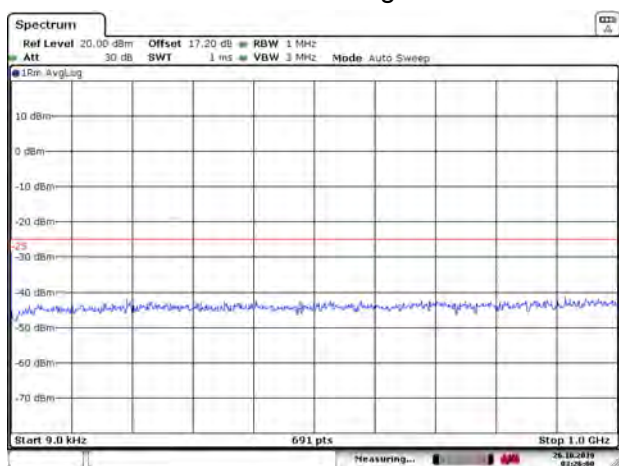
LTE Band 48 5MHz CH-Middle 9kHz~1GHz



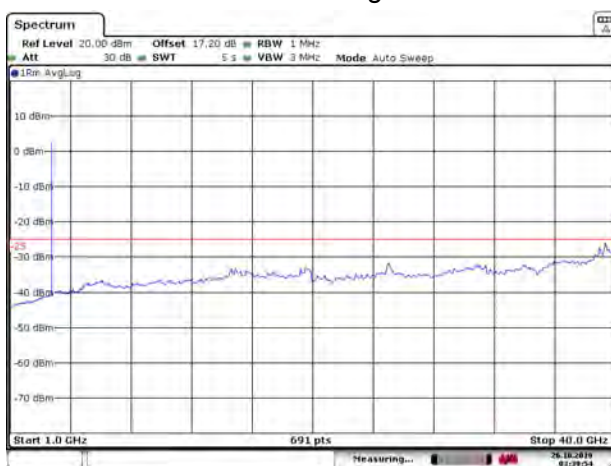
LTE Band 48 5MHz CH-Middle 1GHz~40GHz



LTE Band 48 5MHz CH-High 9kHz~1GHz

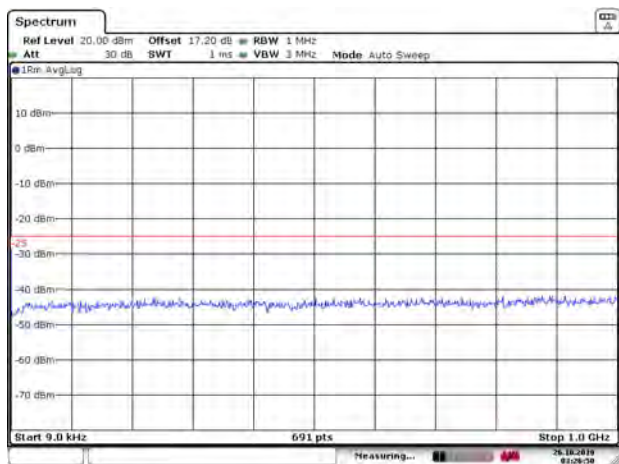


LTE Band 48 5MHz CH-High 1GHz~40GHz



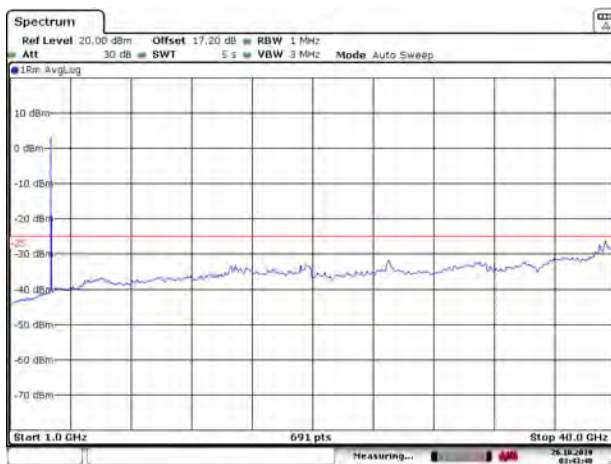


LTE Band 48 10MHz CH-Low 9kHz~1GHz



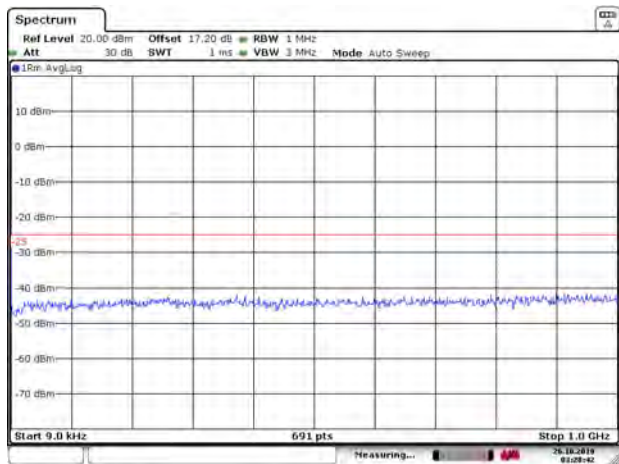
Date: 26.OCT.2018 03:28:51

LTE Band 48 10MHz CH-Low 1GHz~40GHz



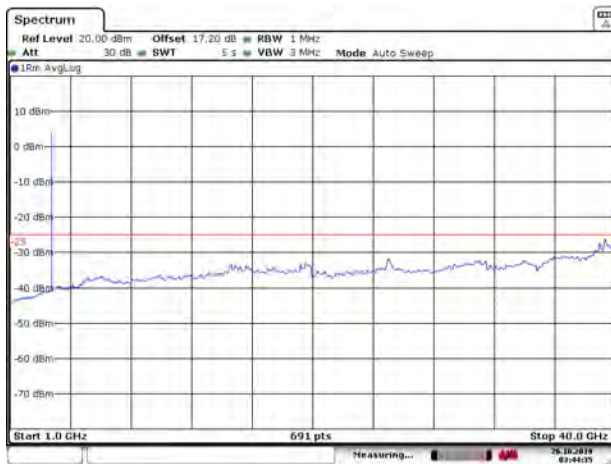
Date: 26.OCT.2018 03:43:48

LTE Band 48 10MHz CH-Middle 9kHz~1GHz



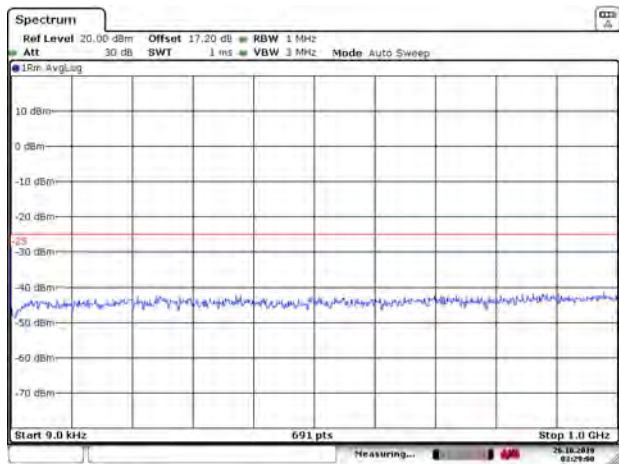
Date: 26.OCT.2018 03:28:42

LTE Band 48 10MHz CH-Middle 1GHz~40GHz



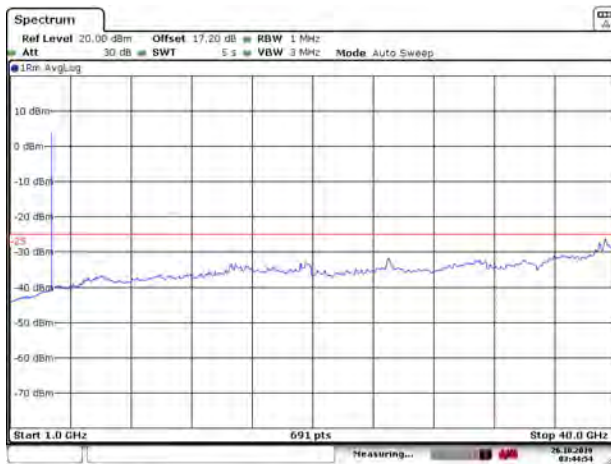
Date: 26.OCT.2018 03:44:35

LTE Band 48 10MHz CH-High 9kHz~1GHz



Date: 26.OCT.2018 03:29:00

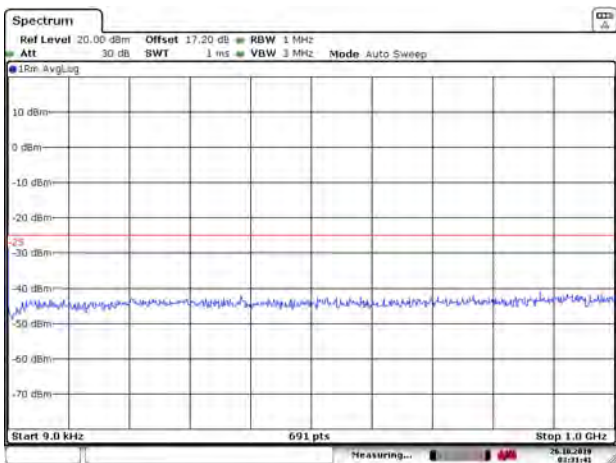
LTE Band 48 10MHz CH-High 1GHz~40GHz



Date: 26.OCT.2018 03:44:55

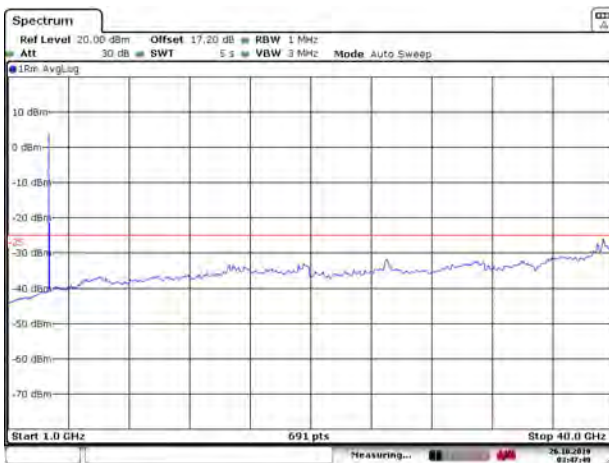


LTE Band 48 15MHz CH-Low 9kHz~1GHz



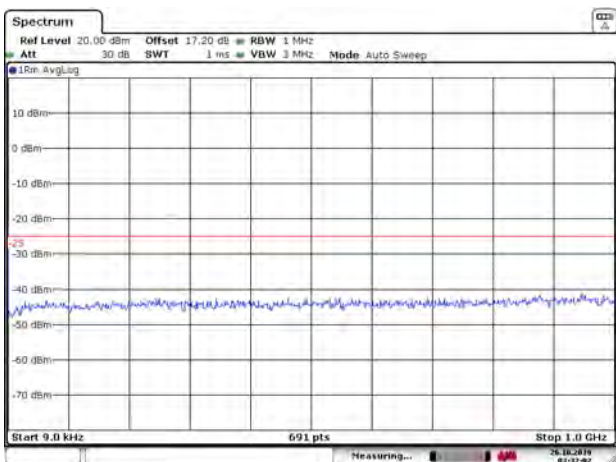
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LTE Band 48 15MHz CH-Low 1GHz~40GHz



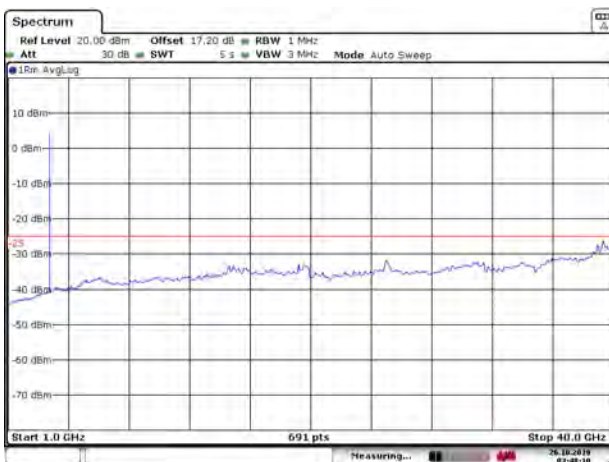
Date: 26.OCT.2019 03:47:49

LTE Band 48 15MHz CH-Middle 9kHz~1GHz



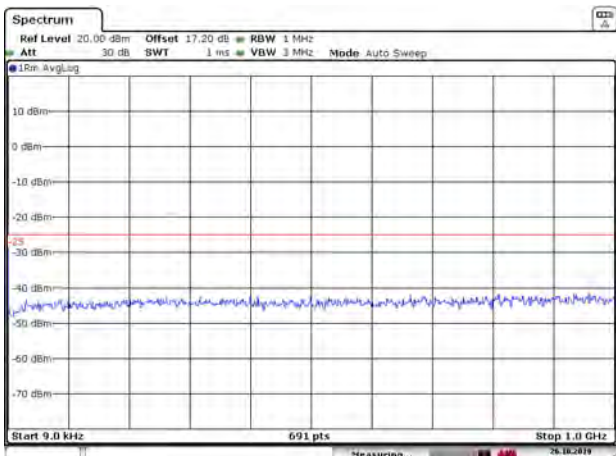
Date: 26.OCT.2019 03:32:02

LTE Band 48 15MHz CH-Middle 1GHz~40GHz



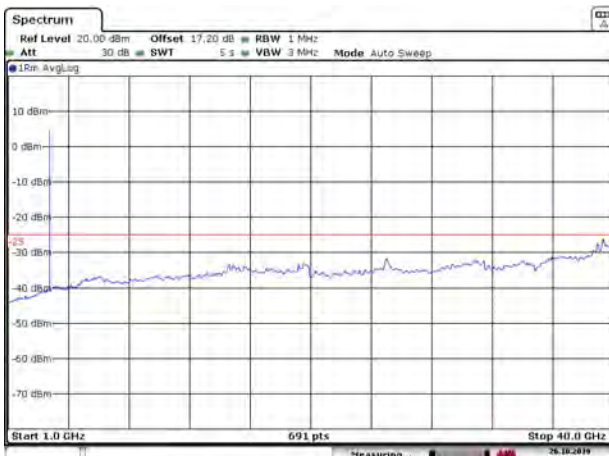
Date: 26.OCT.2019 03:48:10

LTE Band 48 15MHz CH-High 9kHz~1GHz



Date: 26.OCT.2019 03:32:19

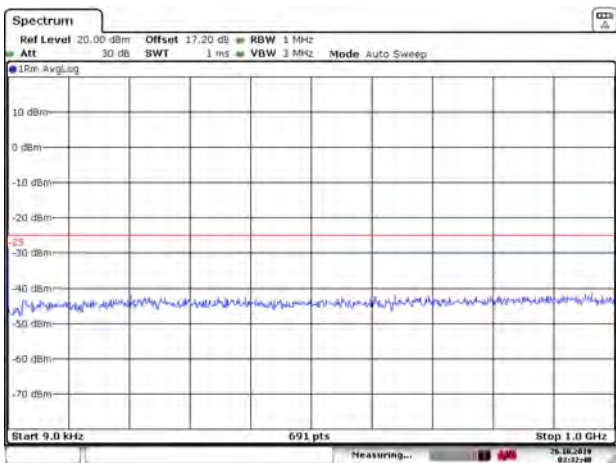
LTE Band 48 15MHz CH-High 1GHz~40GHz



Date: 26.OCT.2019 03:48:55

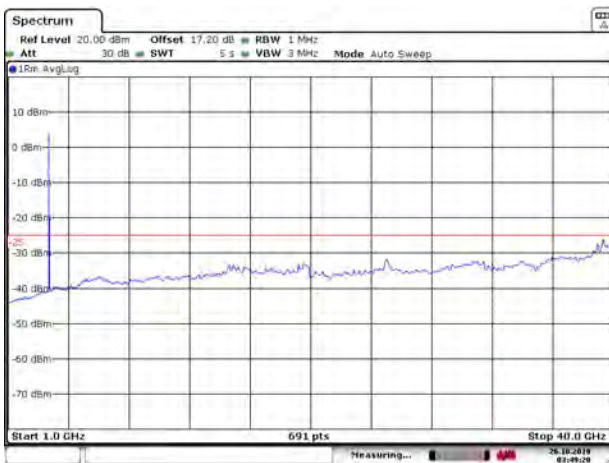


LTE Band 48 20MHz CH-Low 9kHz~1GHz



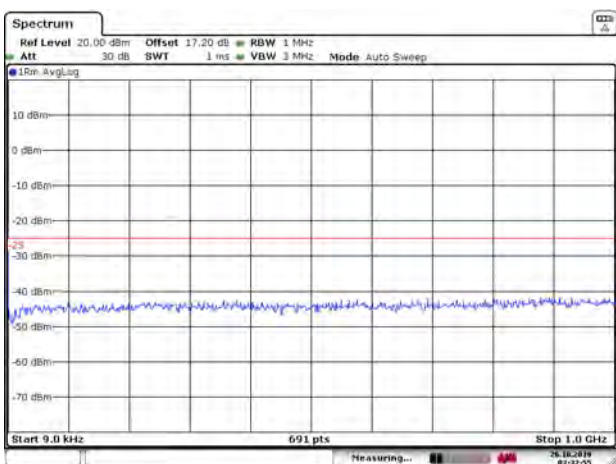
Date: 26.OCT.2018 03:32:40

LTE Band 48 20MHz CH-Low 1GHz~40GHz



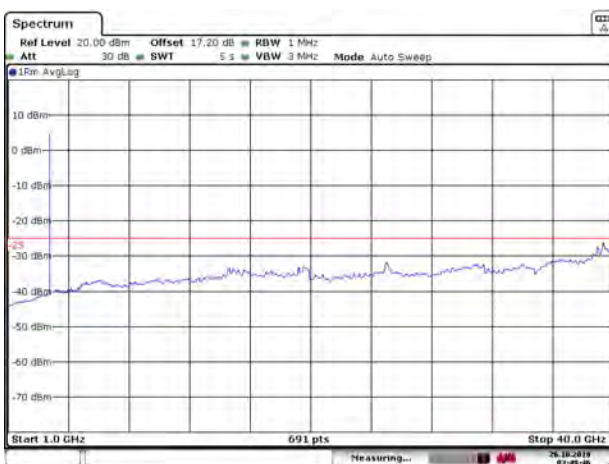
Date: 26.OCT.2018 03:48:20

LTE Band 48 20MHz CH-Middle 9kHz~1GHz



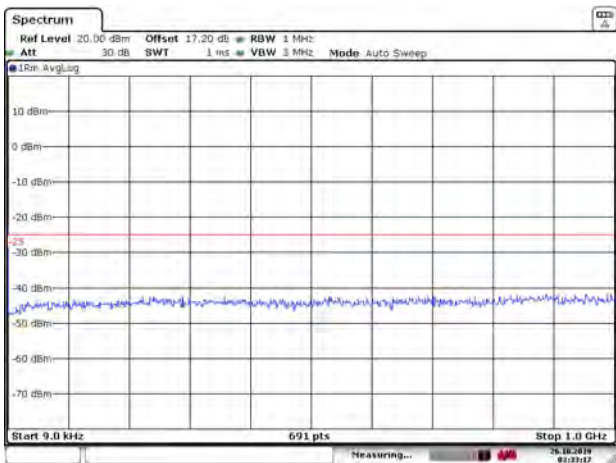
Date: 26.OCT.2018 03:32:56

LTE Band 48 20MHz CH-Middle 1GHz~40GHz



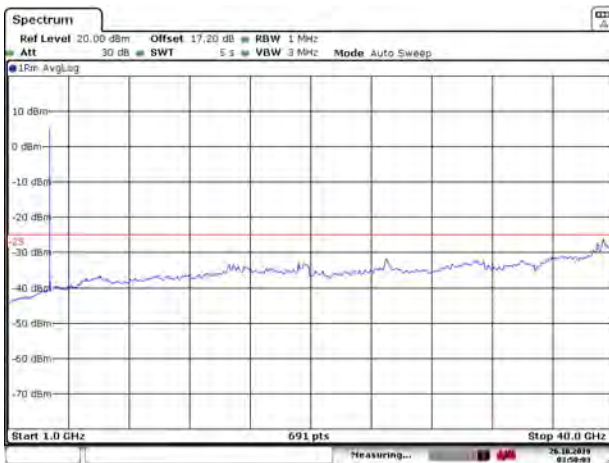
Date: 26.OCT.2018 03:48:46

LTE Band 48 20MHz CH-High 9kHz~1GHz



Date: 26.OCT.2018 03:53:18

LTE Band 48 20MHz CH-High 1GHz~40GHz



Date: 26.OCT.2018 03:50:03

5.6. Field Strength of Spurious Radiation/ Radiated Spurious Emissions

Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
 The measurement results are amend as described below:

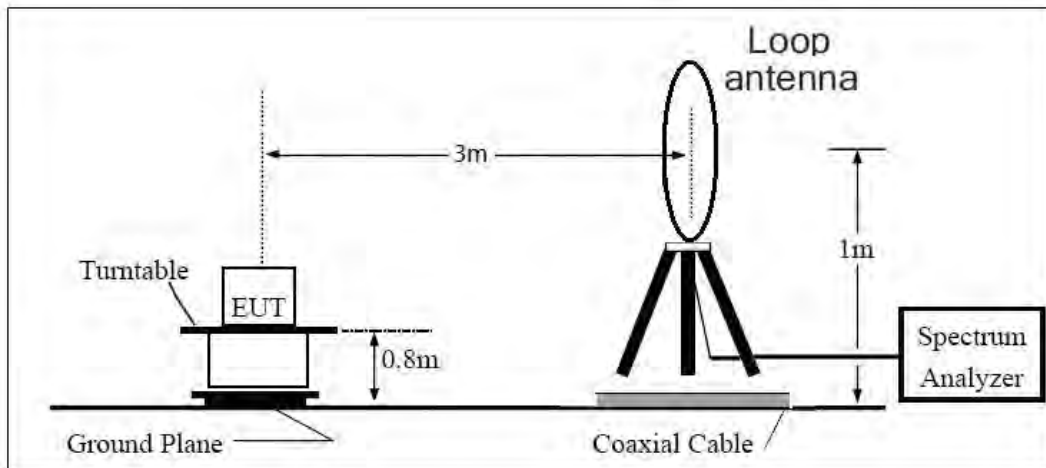
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

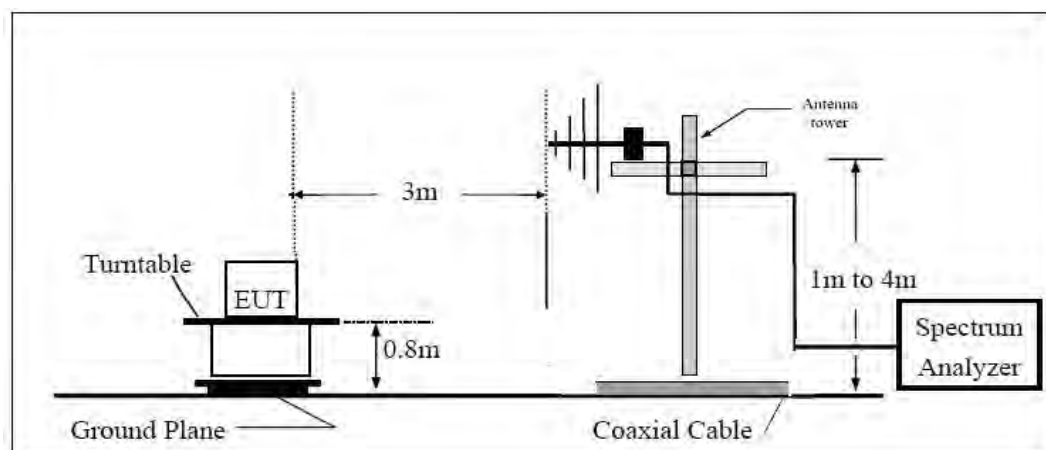
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

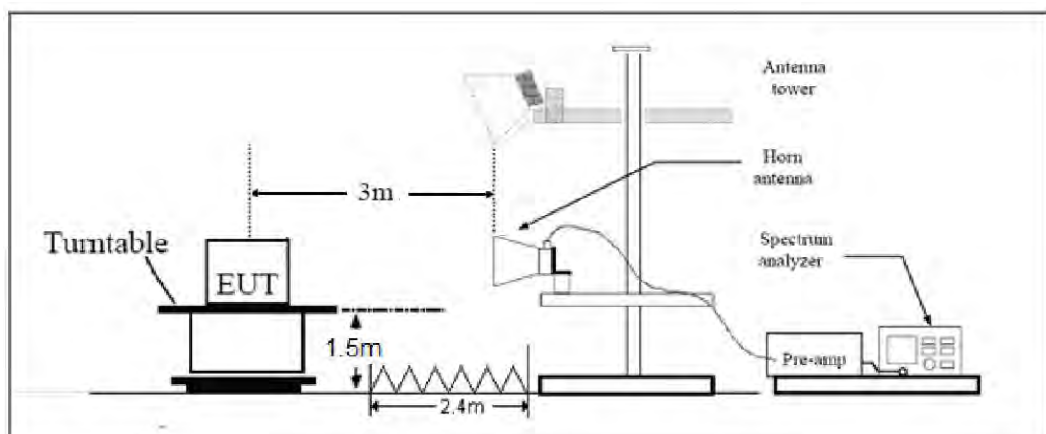
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m



Limits

Rule Part 90.1323 specifies that “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.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

Test Result

Sweep the whole frequency band through the range from 30MHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 48 5MHz CH Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7250.0	-37.80	2.50	11.35	horizontal	-31.1	-13.0	18.10	0
3	10875.0	-49.20	4.20	12.05	horizontal	-43.5	-13.0	30.46	315
4	14500.0	-45.98	5.50	14.23	horizontal	-39.4	-13.0	26.37	45
5	18125.0	--	--	--	--	--	--	--	--
6	21750.0	--	--	--	--	--	--	--	--
7	25375.0	--	--	--	--	--	--	--	--
8	29000.0	--	--	--	--	--	--	--	--
9	32625.0	--	--	--	--	--	--	--	--
10	36250.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

LTE Band 48 20MHz CH Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	7250.0	-37.80	2.50	11.35	horizontal	-31.1	-13.0	18.10	0
3	10875.0	-49.20	4.20	12.05	horizontal	-43.5	-13.0	30.46	315
4	14500.0	-45.98	5.50	14.23	horizontal	-39.4	-13.0	26.37	45
5	18125.0	--	--	--	--	--	--	--	--
6	21750.0	--	--	--	--	--	--	--	--
7	25375.0	--	--	--	--	--	--	--	--
8	29000.0	--	--	--	--	--	--	--	--
9	32625.0	--	--	--	--	--	--	--	--
10	36250.0	--	--	--	--	--	--	--	--

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
2. The worst emission was found in the antenna is Horizontal position.

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Agilent	N9010A	MY50210259	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV40	15195-01-00	2019-05-19	2020-05-18
RF Cable	Agilent	SMA 15cm	0001	2019-06-14	2020-06-13
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Horn Antenna	STEATITE	QSH-SL-26-40-K-15	16779	2017-07-20	2020-07-19
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
RF Cable	Agilent	SMA 15cm	0001	2019-12-13	2020-03-14
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****