RF TEST REPORT

Applicant	Positioning Universal Inc
FCC ID	2AHRH-FJ1000LMA
Product	Vehicle LTE CAT M1 Radio Telecommunications Unit
Model	FJ1000LMA
Report No.	R1811A0487-R2
Issue Date	January 4, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR47 Part 27C (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Jiangpeng Lan

Performed by: Jiangpeng Lan

Kai Xu

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

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Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4)/27.50(c)(10)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h) /27.53(g)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 /27.53(h) / 27.53(g)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) /27.53(g)	PASS
Date of Testing: December 14, 2018~ December 19, 2018			
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.			

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 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

2 General Description of Equipment under Test

Client Information

Applicant	Positioning Universal Inc
Applicant address	4660 La Jolla Village Drive Suite 1100, San Diego, California, United States
Manufacturer	Positioning Universal Inc
Manufacturer address	4660 La Jolla Village Drive Suite 1100, San Diego, California, United States

General information

EUT Description			
Model	FJ1000LMA		
IMEI	/		
Hardware Version	TM120M-A_P1		
Software Version	2127		
Power Supply	External Power Supply		
Antenna Type	Fixed Internal Antenna		
Antenna Gain	-1.4dBi for LTE Band 4 -0.69dBi for LTE Band 12		
Test Mode(s)	LTE Band 4; LTE Band 12;		
Test Modulation	(LTE)QPSK,16QAM		
LTE Category	M1		
Maximum E.I.R.P./ E.R.P.	LTE Band 4:	24.11dBm	
	LTE Band 12:	18.40dBm	
Rated Power Supply Voltage:	12V		
Extreme Voltage	Minimum: 9V Maximum: 36V		
Extreme Temperature	Lowest:-15°C Highest: +75°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
Note：1. 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 CFR47 Part 2 (2018)

FCC CFR47 Part 27C (2018)

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4 Test Configuration

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 and RB size and modulations were investigated.
Subsequently, only the worst case emissions are reported.
The following testing in LTE is set based on the maximum RF Output Power.
The following testing in different Bandwidth is set to detailin the following table:

Test modes are chosen to be reported as the worst case configuration below for LTE Band 4/12:

Test items	Modes	Bandwidth (MHz)				Modulation		RB			Test Channel		
		5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	-	-	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	-	-	O	O	O	O	O	O	O	O
Occupied Bandwidth	LTE 4	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	-	-	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 4	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 12	O	O	-	-	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 4	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	-	-	O	O	-	-	O	O	O	O
Frequency Stability	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	-	-	O	O	O	O	O	O	O	O
Spurious Emissions at Antenna Terminals	LTE 4	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	O	O	-	-	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 4	-	-	-	O	O	-	O	-	-	O	O	O
	LTE 12	-	O	-	-	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

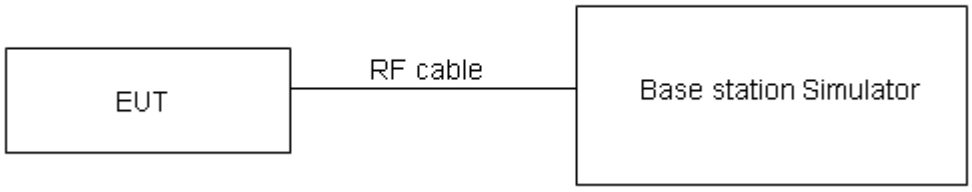
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

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

Test Setup



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

Limits

No specific RF power output requirements in part 2.1046.

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

LTE Band 4	Channel/ Frequency(MHz)	Index	RB# RBstart	Conducted Power (dBm)	
				QPSK	16QAM
5MHz	19975/1712.5	0	1#0	23.49	23.68
		0	6#0	23.09	22.22
	20175/1732.5	0	1#0	23.04	23.25
		0	6#0	22.26	21.84
	20375/1752.5	3	1#5	22.60	22.45
		3	6#0	22.05	21.13
10MHz	20000/1715	0	1#0	23.82	23.59
		0	4#0	23.74	23.09
	20175/1732.5	0	1#0	23.28	23.41
		0	4#0	23.38	22.53
	20350/1750	7	1#5	22.77	22.41
		7	4#2	22.75	21.89
15MHz	20025/1717.5	0	1#0	23.84	23.67
		0	6#0	23.66	23.61
	20175/1732.5	0	1#0	23.26	22.92
		0	6#0	23.45	23.20
	20325/1747.5	11	1#5	22.71	22.50
		11	6#0	22.67	22.55
20MHz	20050/1720	0	1#0	23.80	23.62
		0	6#0	23.68	23.49
	20175/1732.5	0	1#0	23.32	23.17
		0	6#0	23.40	23.25
	20300/1745	15	1#5	22.75	22.85
		15	6#0	22.67	22.53

LTE Band 12	Channel/ Frequency(MHz)	Index	RB# RBstart	Conducted Power (dBm)	
				QPSK	16QAM
5MHz	23035/701.5	0	1#0	23.91	23.70
		0	6#0	22.99	21.91
	23095/707.5	0	1#0	23.81	24.16
		0	6#0	23.02	21.94
	23155/713.5	0	1#5	23.85	23.55
		3	6#0	22.80	21.85
10MHz	23060/704	0	1#0	23.98	23.62
		0	4#0	24.04	23.07
	23095/707.5	0	1#0	23.96	23.61
		0	4#0	24.02	22.96
	23130/711	4	1#5	23.88	24.13
		7	4#2	23.78	22.86

5.2 Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

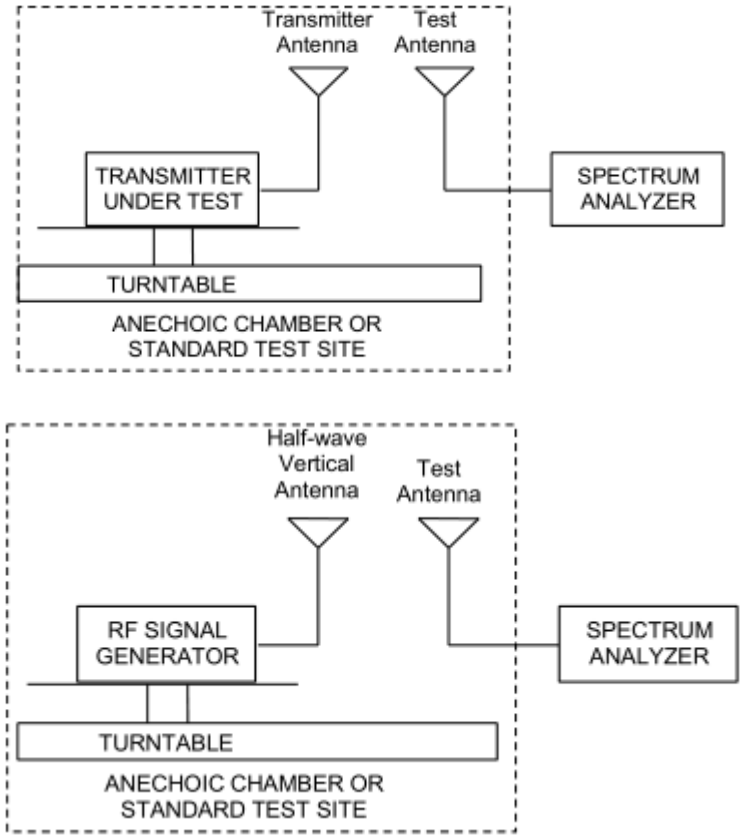
EIRP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBi)

where:dBd refers to gain relative to an ideal dipole.

EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

The RB allocation refers to section 5.1, using the maximum output power configuration.

Test setup



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Limits

Rule Part 27.50(c) (10) specifies that “Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP”

Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Part 27.50(c)(10)Limit	≤ 3 W (34.77 dBm)
Part 27.50(d)(4)Limit	≤ 1 W (30 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 1.19 dB

Test Results

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

LTE Band 4							
Band width	**Frequency (MHz)**	**Ant Pot (H/V)**	**RB**	**Index**	**EIRP (dBm)**	**Limit (dBm)**	**Conclusion**
5 MHz (QPSK)	19975/1712.5	H	1#0	0	23.51	30	Pass
	20175/1732.5	H	1#5	1	23.21	30	Pass
	20375/1752.5	H	1#5	3	23.34	30	Pass
10 MHz (QPSK)	20000/1715	H	4#0	0	24.01	30	Pass
	20175/1732.5	H	4#2	3	23.35	30	Pass
	20350/1750	H	4#2	7	23.90	30	Pass
15 MHz (QPSK)	20025/1717.5	H	1#0	0	24.11	30	Pass
	20175/1732.5	H	1#5	5	23.56	30	Pass
	20325/1747.5	H	1#5	11	24.02	30	Pass
20 MHz (QPSK)	20050/1720	H	6#0	0	23.45	30	Pass
	20175/1732.5	H	6#0	7	22.62	30	Pass
	20300/1745	H	6#0	15	23.30	30	Pass
5 MHz (16QAM)	19975/1712.5	H	1#0	0	23.37	30	Pass
	20175/1732.5	H	1#5	1	23.20	30	Pass
	20375/1752.5	H	1#5	3	22.99	30	Pass
10 MHz (16QAM)	20000/1715	H	4#0	0	23.36	30	Pass
	20175/1732.5	H	4#2	3	22.77	30	Pass
	20350/1750	H	4#2	7	22.69	30	Pass
15 MHz (16QAM)	20025/1717.5	H	1#0	0	23.73	30	Pass
	20175/1732.5	H	1#5	5	23.25	30	Pass
	20325/1747.5	H	1#5	11	23.30	30	Pass
20 MHz (16QAM)	20050/1720	H	6#0	0	23.44	30	Pass
	20175/1732.5	H	6#0	7	22.28	30	Pass
	20300/1745	H	6#0	15	22.46	30	Pass

LTE Band 12								
Band width	Frequency (MHz)	Ant Pot (H/V)	RB	Index	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Conclusion
5 MHz (QPSK)	23035/701.5	H	1#0	0	20.55	18.40	34.77	Pass
	23095/707.5	H	1#5	1	19.85	17.70	34.77	Pass
	23155/713.5	H	1#5	3	19.58	17.43	34.77	Pass
10 MHz (QPSK)	23060/704	H	4#0	0	19.95	17.80	34.77	Pass
	23095/707.5	H	4#2	3	19.26	17.11	34.77	Pass
	23130/711	H	4#2	7	19.16	17.01	34.77	Pass
5 MHz (16QAM)	23035/701.5	H	1#0	0	20.23	18.08	34.77	Pass
	23095/707.5	H	1#5	1	19.50	17.35	34.77	Pass
	23155/713.5	H	1#5	3	19.18	17.03	34.77	Pass
10 MHz (16QAM)	23060/704	H	4#0	0	19.67	17.52	34.77	Pass
	23095/707.5	H	4#2	3	19.21	17.06	34.77	Pass
	23130/711	H	4#2	7	19.11	16.96	34.77	Pass

5.3 Occupied Bandwidth

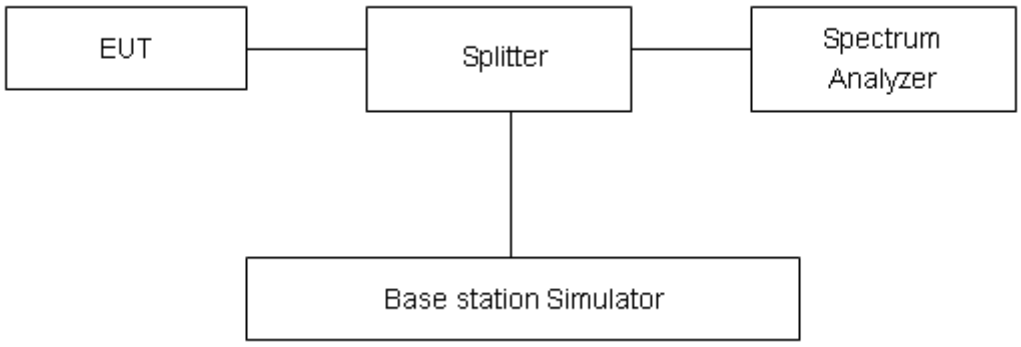
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 51kHz, VBW is set to 160kHz for LTE Band 4/12.
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 in part 2.1049.

Measurement Uncertainty

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

Test Result

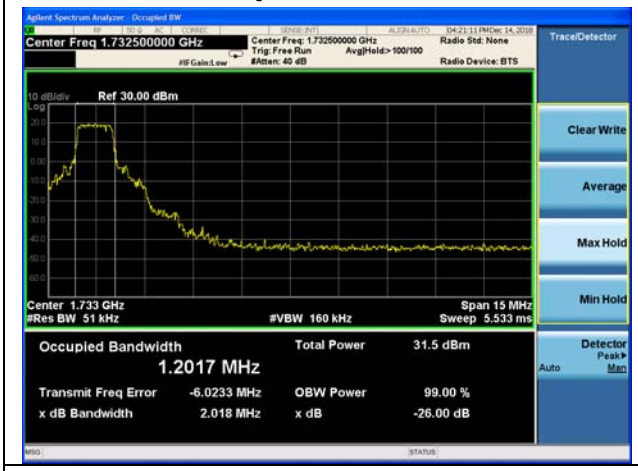
Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
LTE Band4	5MHz	QPSK	20175/1732.5	6#0	0	1.1727	1.782
		16QAM	20175/1732.5	6#0	0	1.0514	1.531
	10MHz	QPSK	20175/1732.5	6#0	0	1.1593	1.976
		16QAM	20175/1732.5	6#0	0	1.0643	1.858
	15MHz	QPSK	20175/1732.5	6#0	0	1.2017	2.018
		16QAM	20175/1732.5	6#0	0	1.0846	2.126
	20MHz	QPSK	20175/1732.5	6#0	0	1.225	2.059
		16QAM	20175/1732.5	6#0	0	1.0995	1.946

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
LTE Band12	5MHz	QPSK	23095/707.5	6#0	0	1.1516	1.496
		16QAM	23095/707.5	6#0	0	1.0049	1.457
	10MHz	QPSK	23095/707.5	6#0	0	1.1461	1.487
		16QAM	23095/707.5	6#0	0	1.0215	1.451

LTE Band 4 QPSK 5MHz CH-Middle

LTE Band 4 QPSK 10MHz CH-Middle

LTE Band 4 QPSK 15MHz CH-Middle

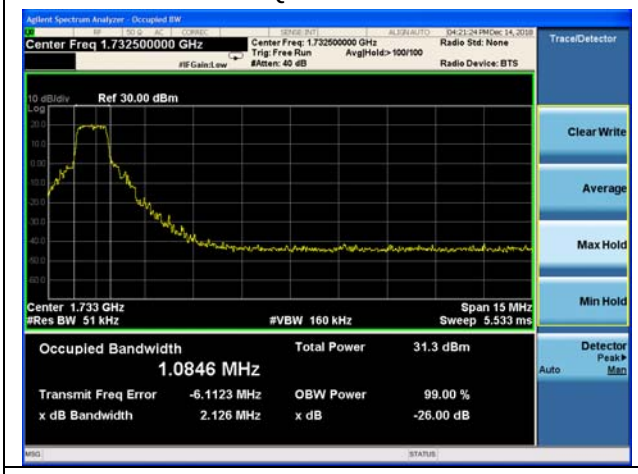


LTE Band 4 QPSK 20MHz CH-Middle

LTE Band 4 16QAM 5MHz CH-Middle

LTE Band 4 16QAM 10MHz CH-Middle

LTE Band 4 16QAM 15MHz CH-Middle



LTE Band 4 16QAM 20MHz CH-Middle

LTE Band 12 QPSK 5MHz CH-Middle

LTE Band 12 QPSK 10MHz CH-Middle

LTE Band 12 16QAM 5MHz CH-Middle

LTE Band 12 16QAM 10MHz CH-Middle

5.4 Band Edge Compliance

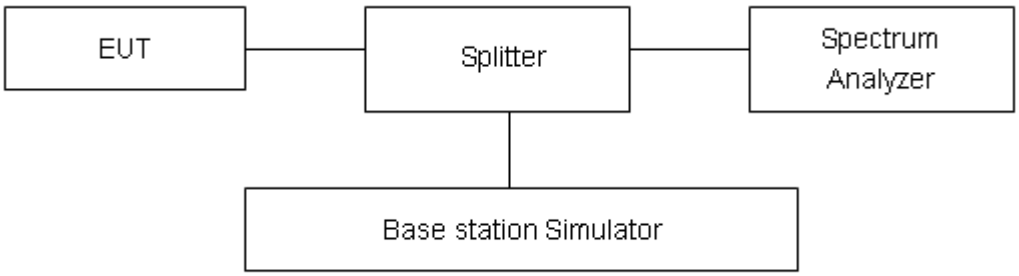
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 testing follows KDB 971168 D01 v03r01 Section 6.0
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.
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12.
on spectrum analyzer.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(h) specifies that " for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}$ (P) dB"
Part 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands

immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Measurement Uncertainty

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

Test Result

All the test traces in the plots shows the test results clearly.

LTE Band 4 QPSK 5MHz CH-Low, 1 RB

LTE Band 4 QPSK 5MHz CH-High, 1 RB

LTE Band 4 QPSK 5MHz CH-Low, 100%RB

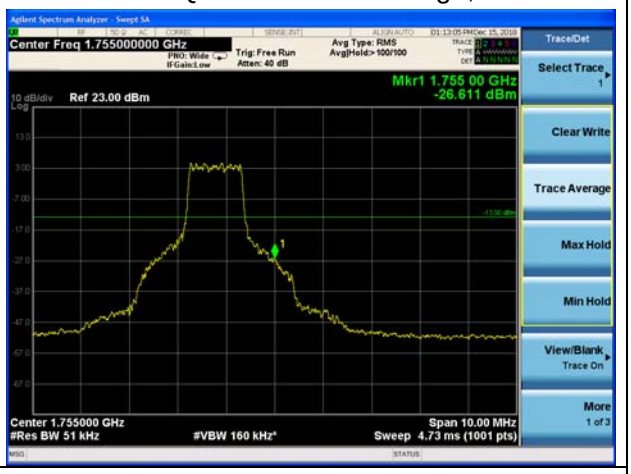
LTE Band 4 QPSK 5MHz CH-High, 100%RB

LTE Band 4 QPSK 10MHz CH-Low, 1 RB

LTE Band 4 QPSK 10MHz CH-High, 1 RB

LTE Band 4 QPSK 10MHz CH-Low, 100%RB

LTE Band 4 QPSK 10MHz CH-High, 100%RB



LTE Band 4 QPSK 15MHz CH-Low, 1 RB

LTE Band 4 QPSK 15MHz CH-High, 1 RB

LTE Band 4 QPSK 15MHz CH-Low, 100%RB

LTE Band 4 QPSK 15MHz CH-High, 100%RB

LTE Band 4 QPSK 20MHz CH-Low, 1 RB

LTE Band 4 QPSK 20MHz CH-High, 1 RB

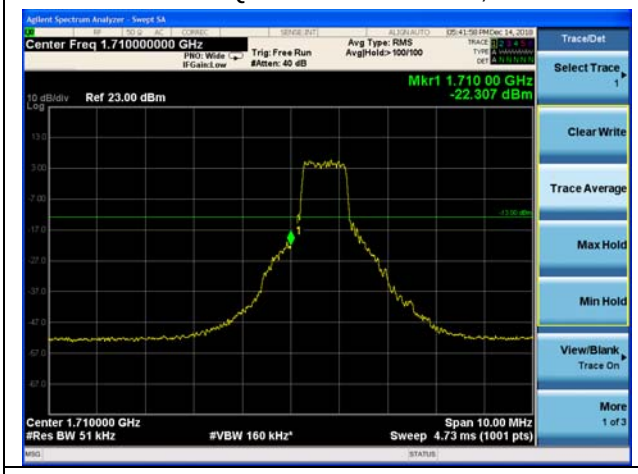
LTE Band 4 QPSK 20MHz CH-Low, 100%RB

LTE Band 4 QPSK 20MHz CH-High, 100%RB

LTE Band 4 16QAM 5MHz CH-Low, 1 RB

LTE Band 4 16QAM 5MHz CH-High, 1 RB

LTE Band 4 16QAM 5MHz CH-Low, 100%RB

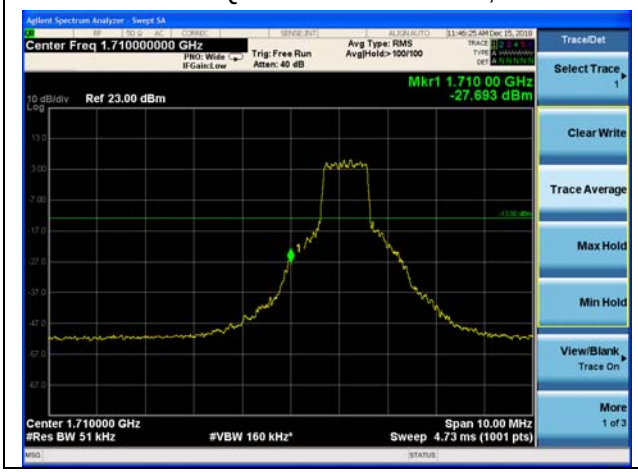


LTE Band 4 16QAM 5MHz CH-High, 100%RB

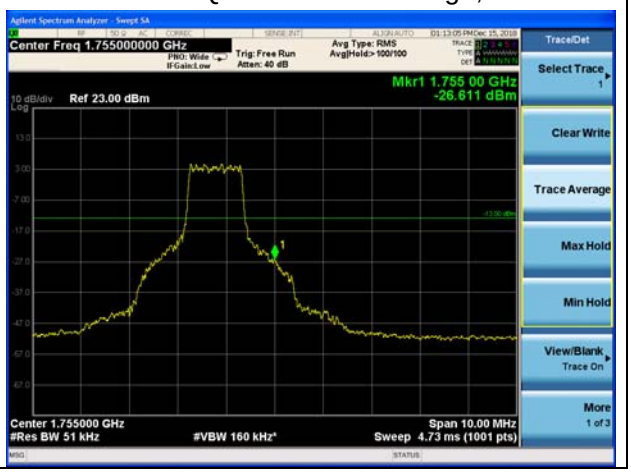
LTE Band 4 16QAM 10MHz CH-Low, 1 RB

LTE Band 4 16QAM 10MHz CH-High, 1 RB

LTE Band 4 16QAM 10MHz CH-Low, 100%RB



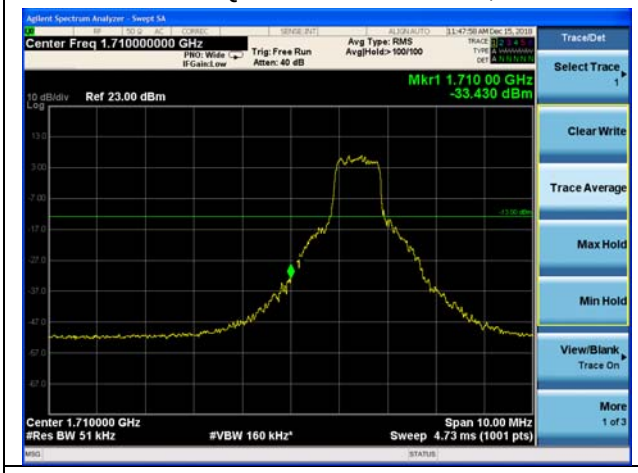
LTE Band 4 16QAM 10MHz CH-High, 100%RB



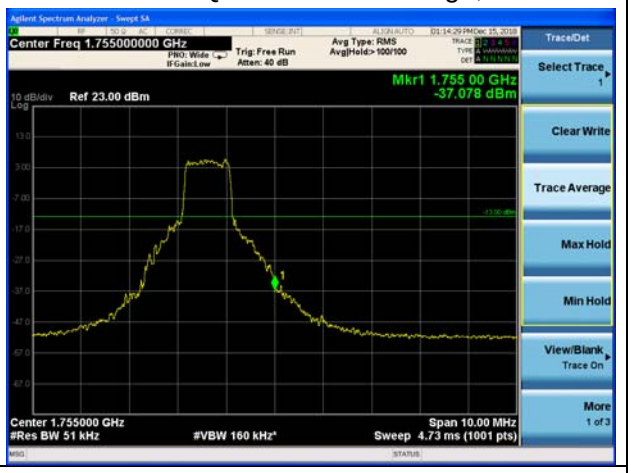
LTE Band 4 16QAM 15MHz CH-Low, 1 RB

LTE Band 4 16QAM 15MHz CH-High, 1 RB

LTE Band 4 16QAM 15MHz CH-Low, 100%RB



LTE Band 4 16QAM 15MHz CH-High, 100%RB



LTE Band 4 16QAM 20MHz CH-Low, 1 RB

LTE Band 4 16QAM 20MHz CH-High, 1 RB

LTE Band 4 16QAM 20MHz CH-Low, 100%RB

LTE Band 4 16QAM 20MHz CH-High, 100%RB

LTE Band 12 QPSK 5MHz CH-Low, 1 RB

LTE Band 12 QPSK 5MHz CH-High, 1 RB

LTE Band 12 QPSK 5MHz CH-Low, 100%RB

LTE Band 12 QPSK 5MHz CH-High, 100%RB

LTE Band 12 QPSK 10MHz CH-Low, 1 RB

LTE Band 12 QPSK 10MHz CH-High, 1 RB

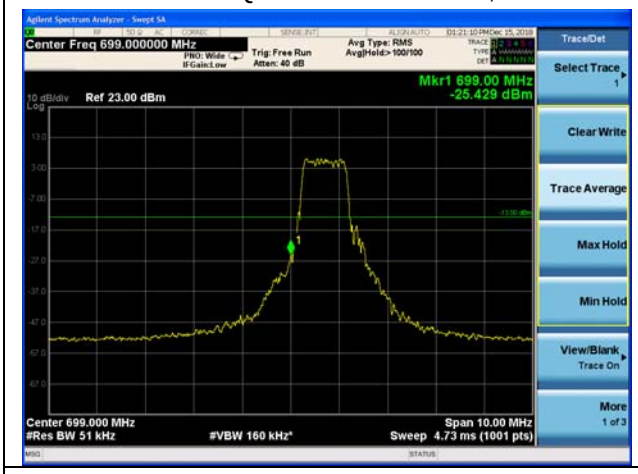
LTE Band 12 QPSK 10MHz CH-Low, 100%RB

LTE Band 12 QPSK 10MHz CH-High, 100%RB

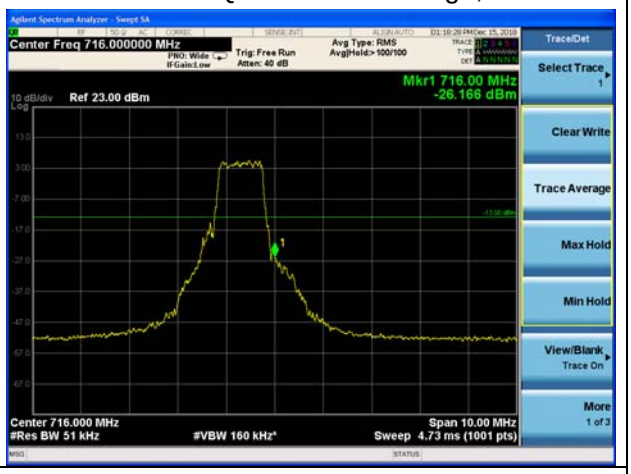
LTE Band 12 16QAM 5MHz CH-Low, 1 RB

LTE Band 12 16QAM 5MHz CH-High, 1 RB

LTE Band 12 16QAM 5MHz CH-Low, 100%RB



LTE Band 12 16QAM 5MHz CH-High, 100%RB



LTE Band 12 16QAM 10MHz CH-Low, 1 RB

LTE Band 12 16QAM 10MHz CH-High, 1 RB

LTE Band 12 16QAM 10MHz CH-Low, 100%RB

LTE Band 12 16QAM 10MHz CH-High, 100%RB

5.5 Peak-to-Average Power Ratio (PAPR)

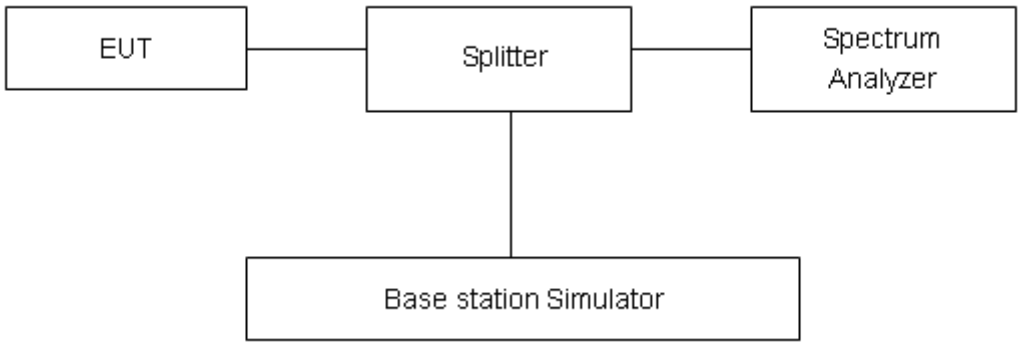
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (*e.g.*, dBm). Determine the PAPR from:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. 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.

Measurement Uncertainty

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

Test Results

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
LTE Band4	5MHz	QPSK	20175/1732.5	25.63	18.79	6.84
		16QAM	20175/1732.5	25.75	18.71	7.04
	10MHz	QPSK	20175/1732.5	25.62	17.76	7.86
		16QAM	20175/1732.5	25.80	17.92	7.88
	15MHz	QPSK	20175/1732.5	25.67	18.41	7.26
		16QAM	20175/1732.5	25.79	17.81	7.98
	20MHz	QPSK	20175/1732.5	25.68	16.83	8.85
		16QAM	20175/1732.5	25.77	15.86	9.91

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
LTE Band12	5MHz	QPSK	23095/707.5	27.81	19.17	8.64
		16QAM	23095/707.5	28.01	18.69	9.32
	10MHz	QPSK	23095/707.5	27.84	18.84	9.00
		16QAM	23095/707.5	28.03	19.52	8.51

5.6 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -15°C to +75°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°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 -15°C to +75°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

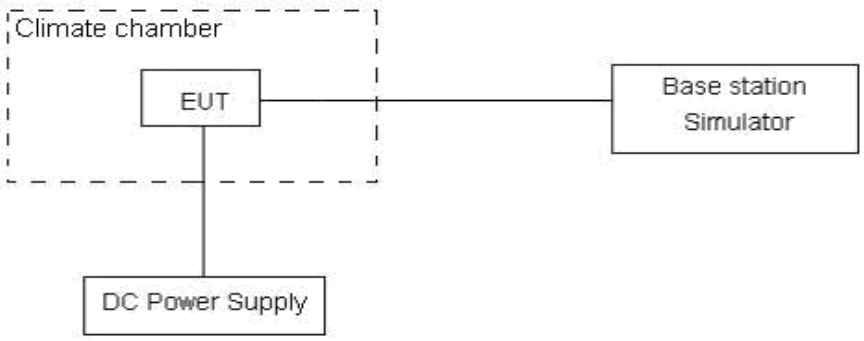
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 9V and 36V, with a nominal voltage of 12V.

Test setup



Limits

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=0.01ppm.

Test Result

LTE Band 4					
(QPSK, 20MHz BANDWIDTH)					
Condition		1710	1755	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Extreme（75°C）	Normal	1711.2371	1753.8218	14.76	0.00852
Extreme（70°C）		1711.2375	1753.8213	6.52	0.00376
Extreme（60°C）		1711.2371	1753.8217	8.95	0.00517
Extreme（50°C）		1711.2456	1753.8132	13.54	0.00782
Extreme（40°C）		1711.2412	1753.8178	25.11	0.01449
Extreme（30°C）		1711.2417	1753.8171	23.01	0.01328
Extreme（20°C）		1711.2423	1753.8168	18.41	0.01063
Extreme（10°C）		1711.2385	1753.8203	7.22	0.00417
Extreme（0°C）		1711.2444	1753.8144	19.64	0.01134
Extreme（-10°C）		1711.2381	1753.8207	17.43	0.01006
Extreme（-15°C）		1711.2422	1753.8166	28.65	0.01654
25°C	LV	1711.2425	1753.8168	2.84	0.00164
	HV	1711.2369	1753.8219	4.65	0.00268
(16QAM, 20MHz BANDWIDTH)					
Condition		1710	1755	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Extreme（75°C）	Normal	1711.2337	1753.8252	7.58	0.00438
Extreme（70°C）		1711.2332	1753.8257	18.34	0.01059
Extreme（60°C）		1711.2335	1753.8253	19.64	0.01134
Extreme（50°C）		1711.2254	1753.8338	6.28	0.00362
Extreme（40°C）		1711.2296	1753.8292	5.18	0.00299
Extreme（30°C）		1711.2289	1753.8299	13.62	0.00786
Extreme（20°C）		1711.2286	1753.8302	13.58	0.00784
Extreme（10°C）		1711.2321	1753.8267	9.64	0.00556
Extreme（0°C）		1711.2262	1753.8326	3.78	0.00218
Extreme（-10°C）		1711.2325	1753.8263	6.95	0.00401
Extreme（-15°C）		1711.2284	1753.8304	18.34	0.01059
25°C	LV	1711.2286	1753.8302	7.43	0.00429
	HV	1711.2337	1753.8251	15.73	0.00908

LTE Band 12					
(QPSK, 10MHz BANDWIDTH)					
Condition		699	716	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Extreme（75C）	Normal	699.5345	715.4749	5.32	0.00752
Extreme（70C）		699.5340	715.4754	4.11	0.00581
Extreme（60C）		699.5334	715.4753	8.19	0.01158
Extreme（50C）		699.5419	715.4835	15.24	0.02154
Extreme（40C）		699.5373	715.4789	18.67	0.02639
Extreme（30C）		699.5380	715.4796	11.23	0.01587
Extreme（20C）		699.5383	715.4799	9.56	0.01351
Extreme（10C）		699.5348	715.4764	14.29	0.02020
Extreme（0C）		699.5407	715.4823	16.77	0.02370
Extreme（-10C）		699.5344	715.4762	8.84	0.01249
Extreme（-15C）		699.5385	715.4801	2.64	0.00373
25°C	LV	699.5383	715.4799	19.54	0.02762
	HV	699.5332	715.4748	14.37	0.02031
(16QAM, 10MHz BANDWIDTH)					
Condition		699	716	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Extreme（75C）	Normal	699.5299	715.4703	6.26	0.00885
Extreme（70C）		699.5294	715.4708	9.54	0.01348
Extreme（60C）		699.5298	715.4714	4.86	0.00687
Extreme（50C）		699.5213	715.4629	15.84	0.02239
Extreme（40C）		699.5259	715.4675	14.31	0.02023
Extreme（30C）		699.5252	715.4668	4.20	0.00594
Extreme（20C）		699.5249	715.4665	6.57	0.00929
Extreme（10C）		699.5284	715.4765	18.92	0.02674
Extreme（0C）		699.5225	715.4641	3.22	0.00455
Extreme（-10C）		699.5288	715.4704	7.46	0.01054
Extreme（-15C）		699.5247	715.4663	12.38	0.01750
25°C	LV	699.5249	715.4665	16.74	0.02366
	HV	699.5300	715.4716	6.01	0.00849

5.7 Spurious Emissions at Antenna Terminals

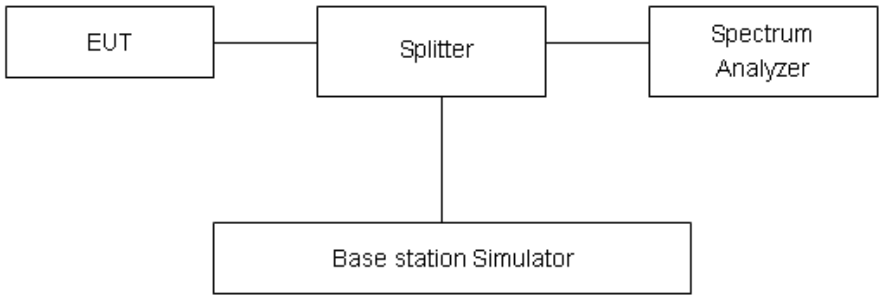
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz
RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.
Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB..”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53 (h)/(g) Limit	-13 dBm

Measurement Uncertainty

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

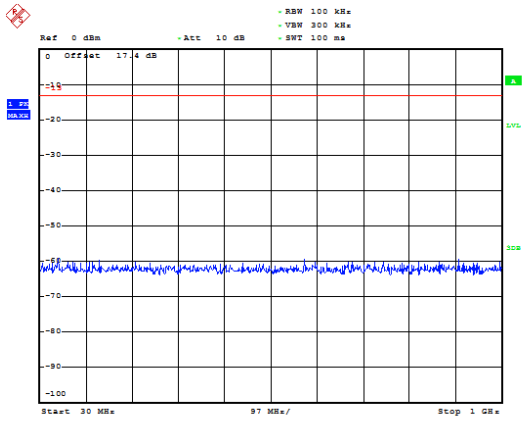
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-27GHz	1.407 dB

Test Result

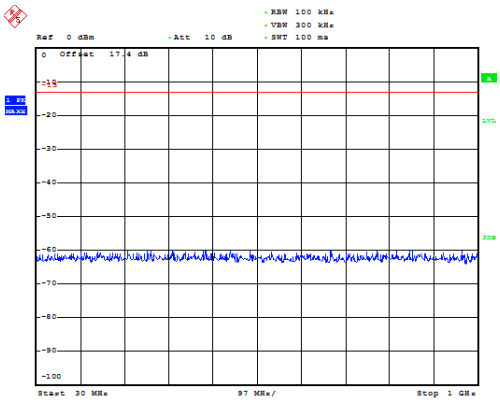
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

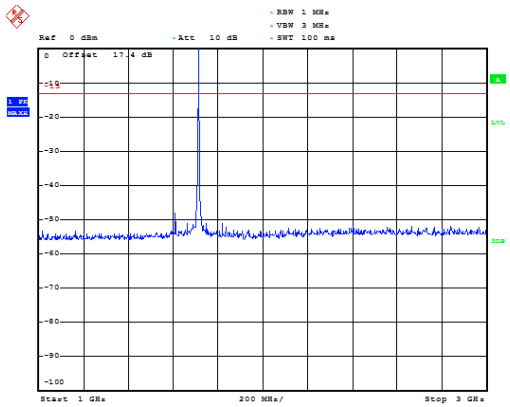
LTE Band 4 5MHz CH-Low 30MHz~1GHz



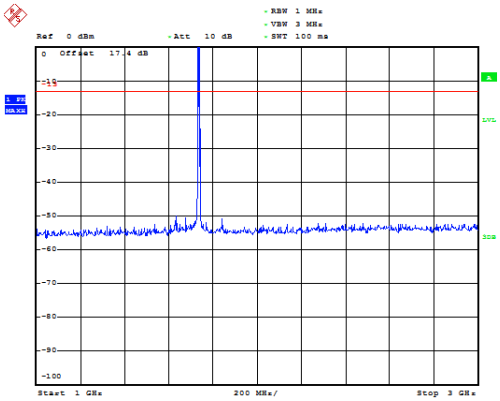
LTE Band 4 5MHz CH-Middle 30MHz~1GHz



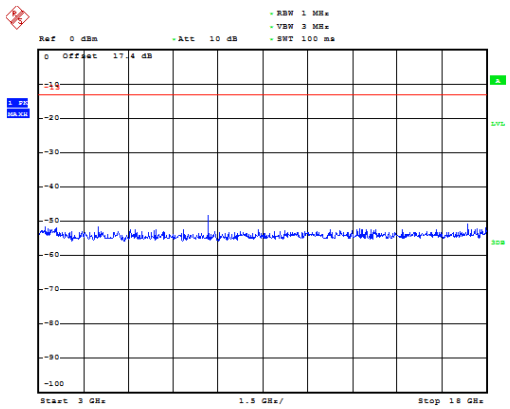
LTE Band 4 5MHz CH-Low 1GHz~3GHz



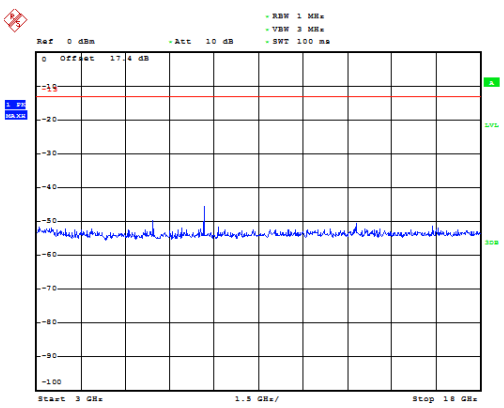
LTE Band 4 5MHz CH-Middle 1GHz~3GHz



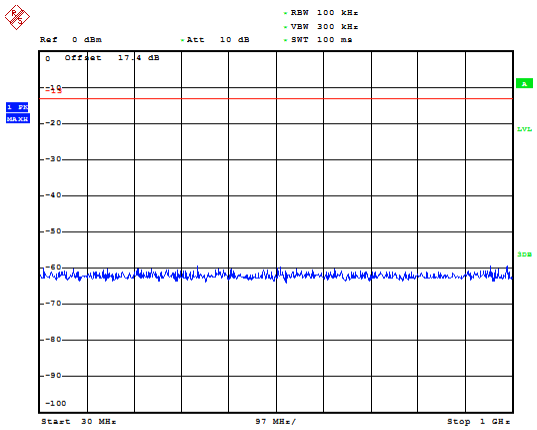
LTE Band 4 5MHz CH-Low 3GHz~18GHz



LTE Band 4 5MHz CH-Middle 3GHz~18GHz

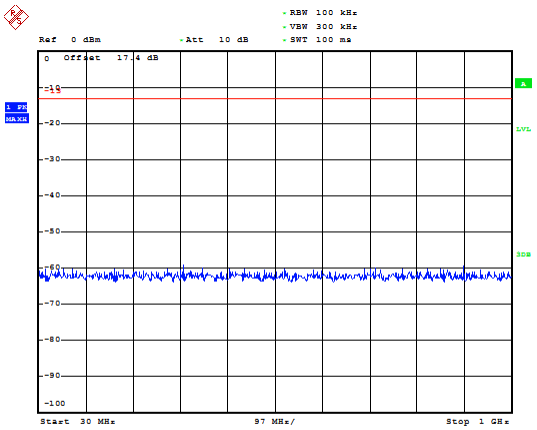


LTE Band 4 5MHz CH-High 30MHz~1GHz



Date: 18.DEC.2018 21:24:01

LTE Band 4 10MHz CH-Low 30MHz~1GHz



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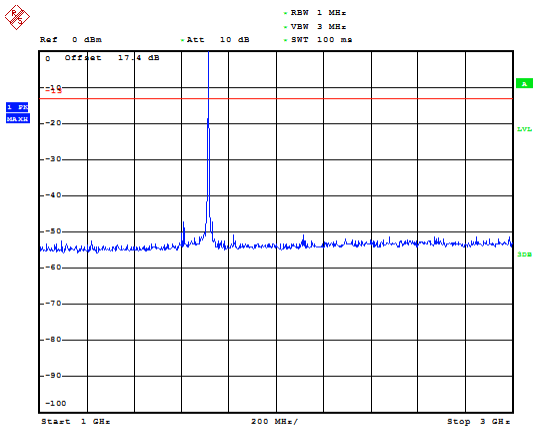
LTE Band 4 5MHz CH-High 1GHz~3GHz



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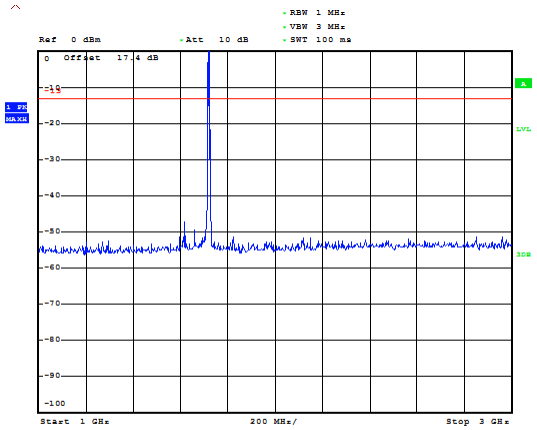
LTE Band 4 10MHz CH-Low 1GHz~3GHz



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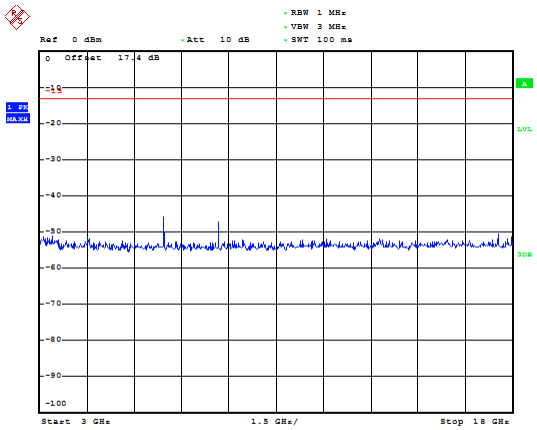
LTE Band 4 5MHz CH-High 3GHz~18GHz



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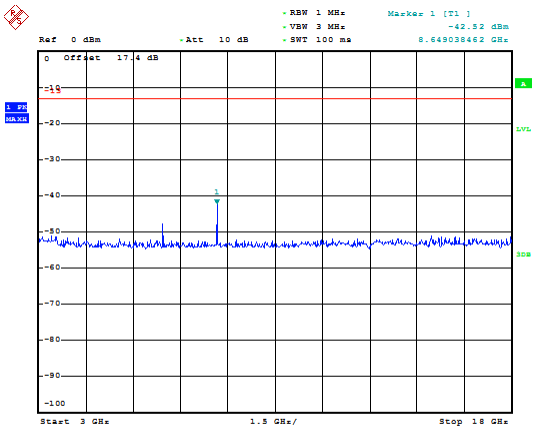
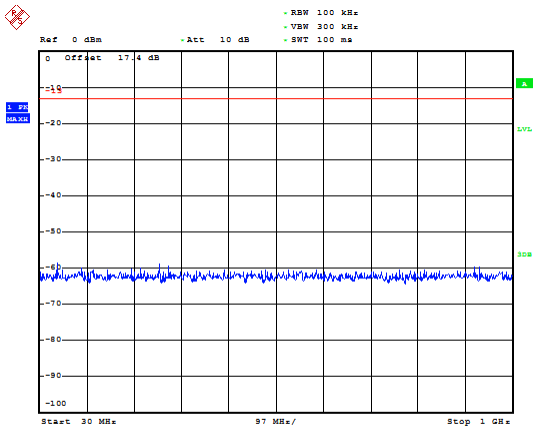
LTE Band 4 10MHz CH-Low 3GHz~18GHz



Date: 18.DEC.2018 20:18:32

LTE Band 4 10MHz CH-Middle 30MHz~1GHz



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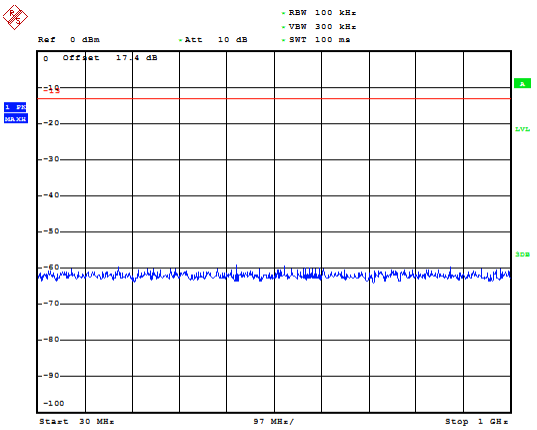
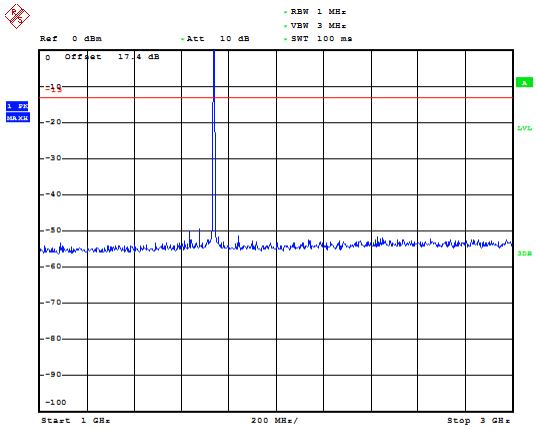
LTE Band 4 10MHz CH-High 30MHz~1GHz



Date: 18.DEC.2018 21:25:10

LTE Band 4 10MHz CH-Middle 1GHz~3GHz



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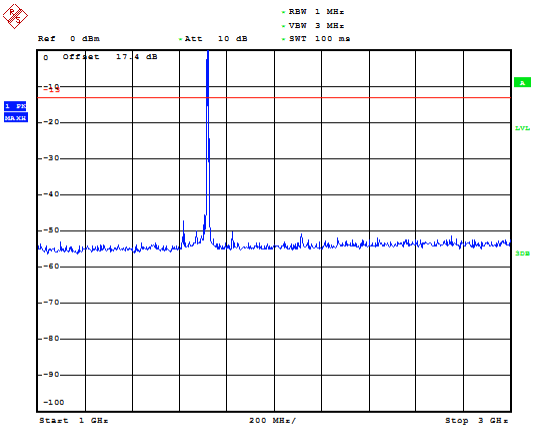
LTE Band 4 10MHz CH-High 1GHz~3GHz



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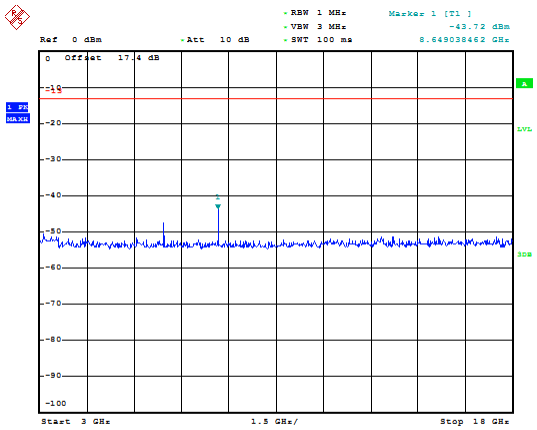
LTE Band 4 10MHz CH-Middle 3GHz~18GHz



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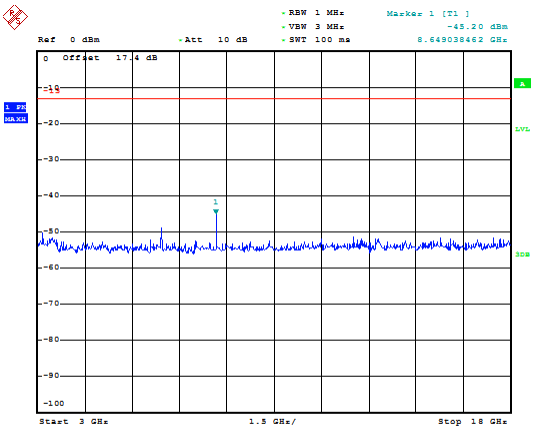
LTE Band 4 10MHz CH-High 3GHz~18GHz



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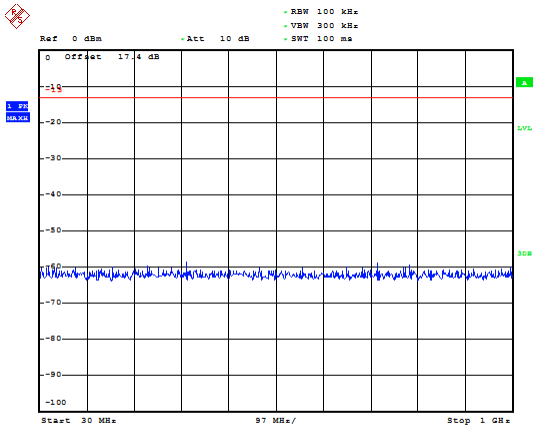
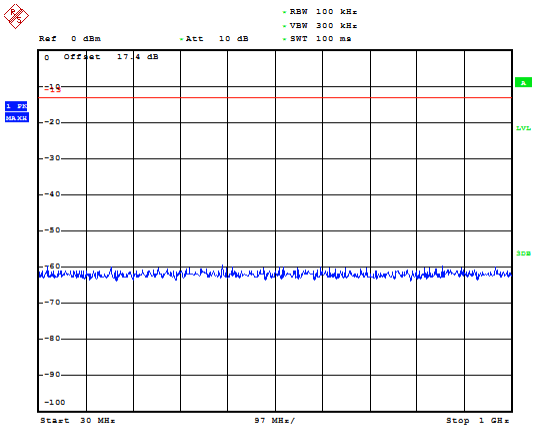
LTE Band 4 15MHz CH-Low 30MHz~1GHz



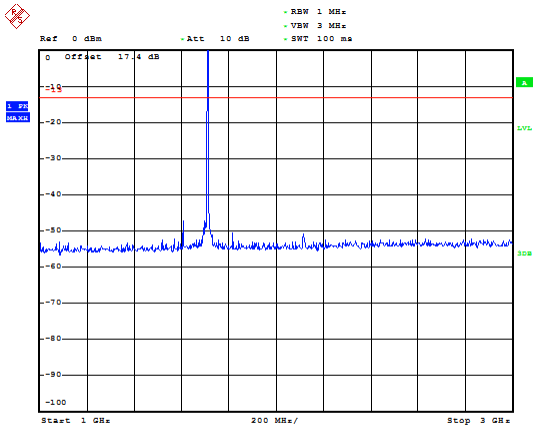
Date: 18.DEC.2018 21:25:32

LTE Band 4 15MHz CH-Middle 30MHz~1GHz



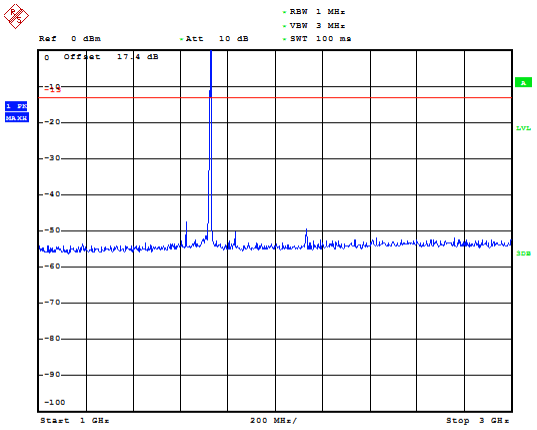
Date: 18.DEC.2018 21:25:42

LTE Band 4 15MHz CH-Low 1GHz~3GHz



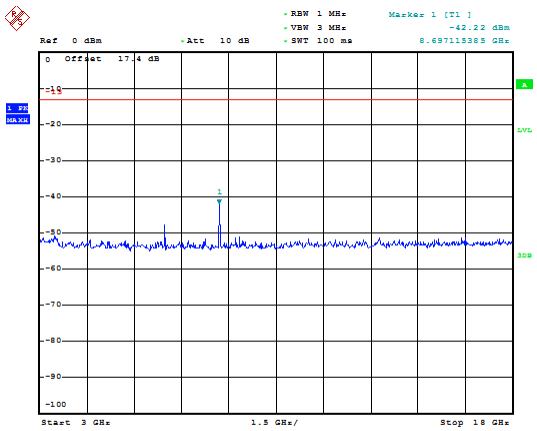
Date: 19.DEC.2018 09:56:57

LTE Band 4 15MHz CH-Middle 1GHz~3GHz



Date: 19.DEC.2018 10:03:38

LTE Band 4 15MHz CH-Low 3GHz~18GHz



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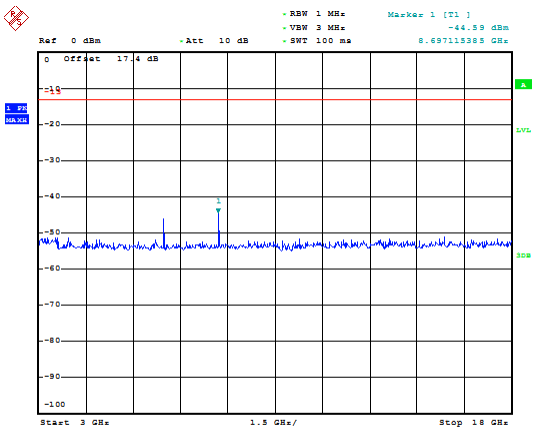
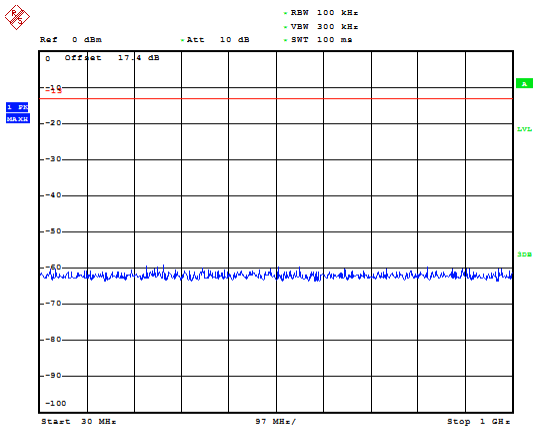
LTE Band 4 15MHz CH-Middle 3GHz~18GHz



Date: 18.DEC.2018 20:21:09

LTE Band 4 15MHz CH-High 30MHz~1GHz



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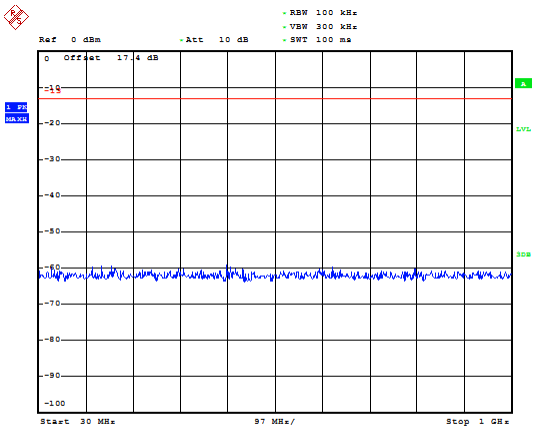
LTE Band 4 20MHz CH-Low 30MHz~1GHz



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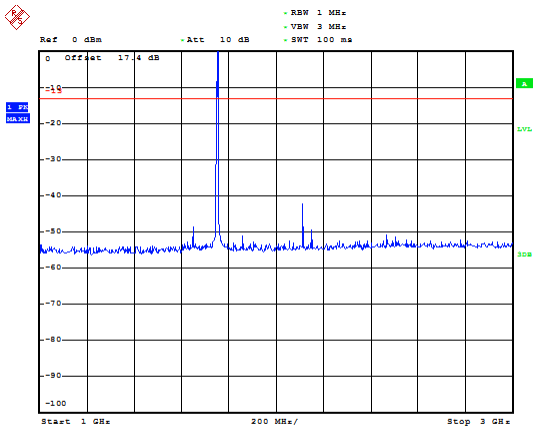
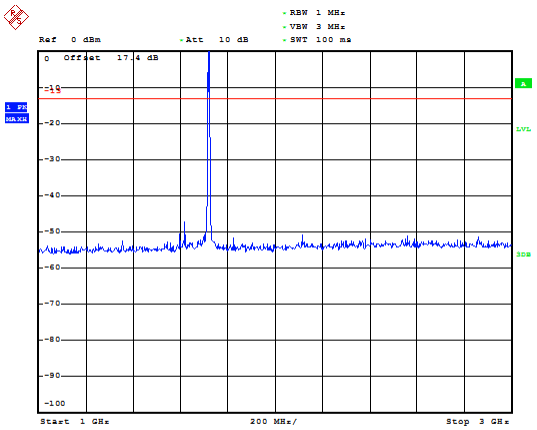
LTE Band 4 15MHz CH-High 1GHz~3GHz



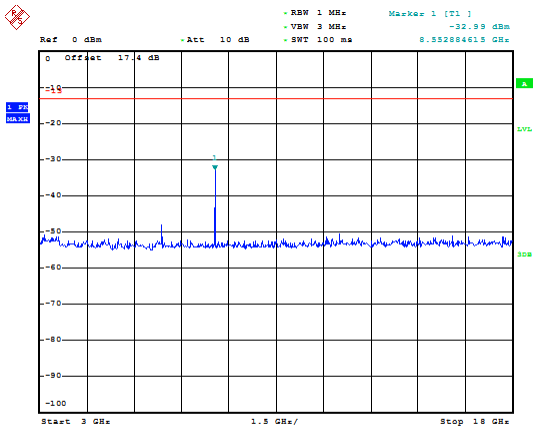
Date: 19.DEC.2018 09:57:19

LTE Band 4 20MHz CH-Low 1GHz~3GHz



Date: 19.DEC.2018 09:57:54

LTE Band 4 15MHz CH-High 3GHz~18GHz



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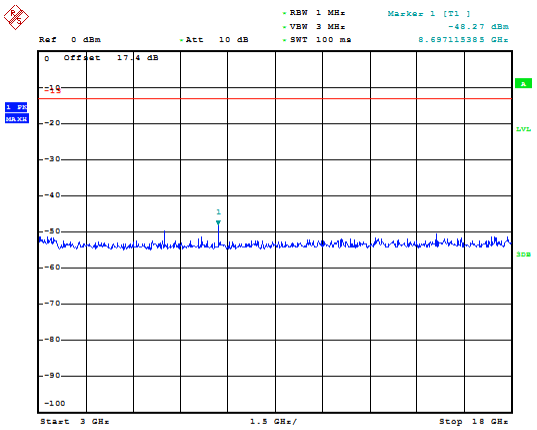
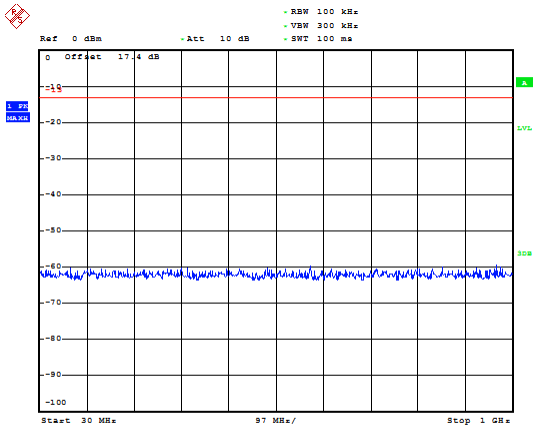
LTE Band 4 20MHz CH-Low 3GHz~18GHz



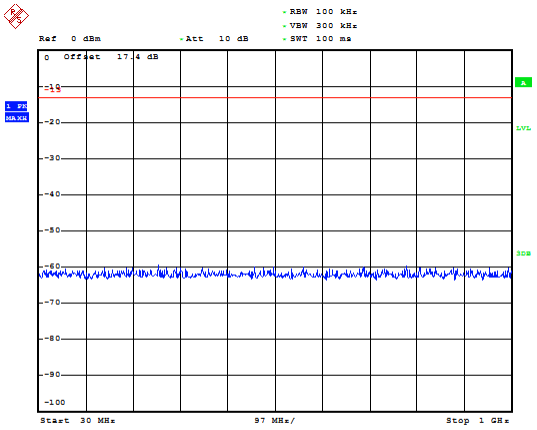
Date: 18.DEC.2018 20:25:14

LTE Band 4 20MHz CH- Middle 30MHz~1GHz



Date: 18.DEC.2018 21:26:21

LTE Band 4 20MHz CH- High 30MHz~1GHz



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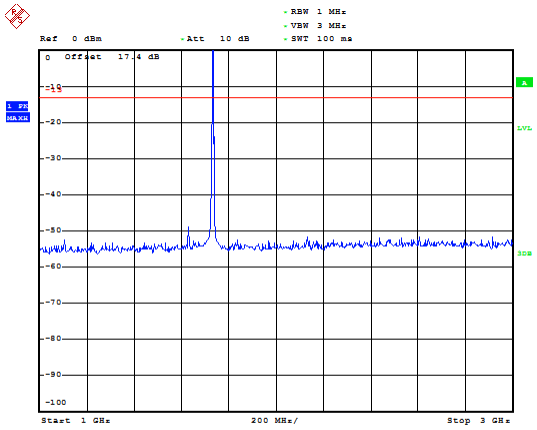
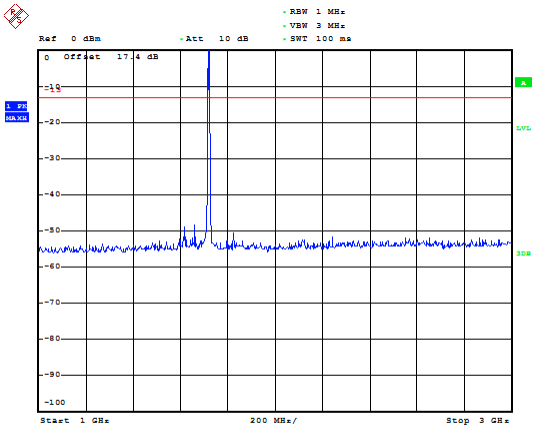
LTE Band 4 20MHz CH- Middle 1GHz~3GHz



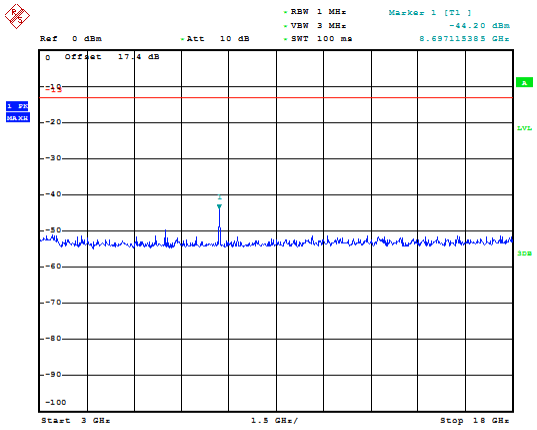
Date: 19.DEC.2018 09:59:08

LTE Band 4 20MHz CH- High 1GHz~3GHz



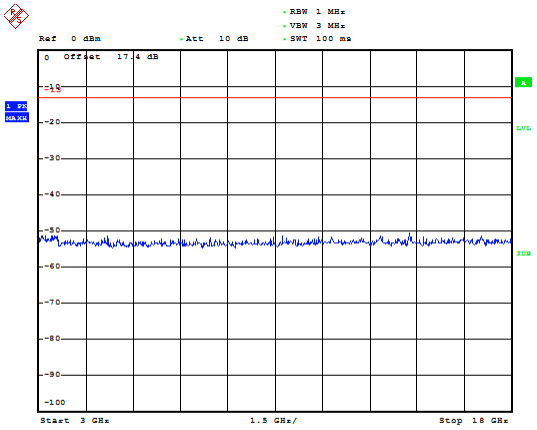
Date: 19.DEC.2018 09:58:12

LTE Band 4 20MHz CH- Middle 3GHz~18GHz



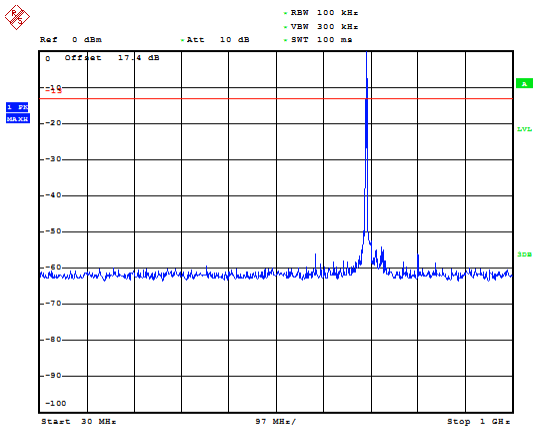
Date: 18.DEC.2018 20:24:29

LTE Band 4 20MHz CH- High 3GHz~18GHz



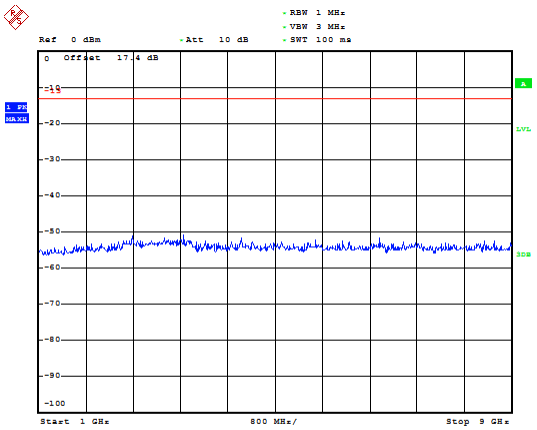
Date: 18.DEC.2018 20:25:45

LTE Band 12 5MHz CH-Low 30MHz~1GHz



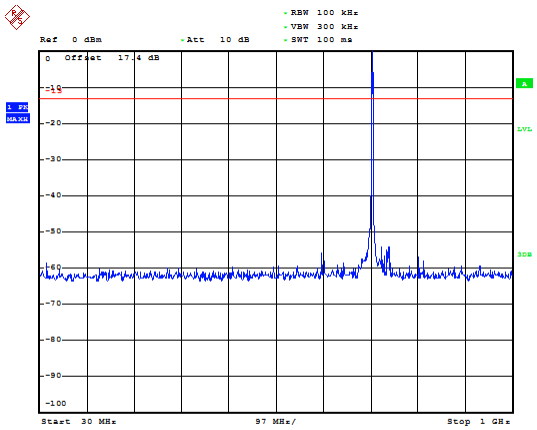
Date: 18.DEC.2018 20:48:22

LTE Band 12 5MHz CH-Low 1GHz~9GHz



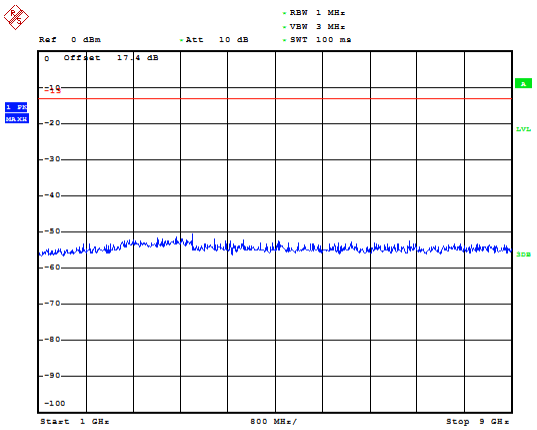
Date: 18.DEC.2018 20:28:03

LTE Band 12 5MHz CH- Middle 30MHz~1GHz



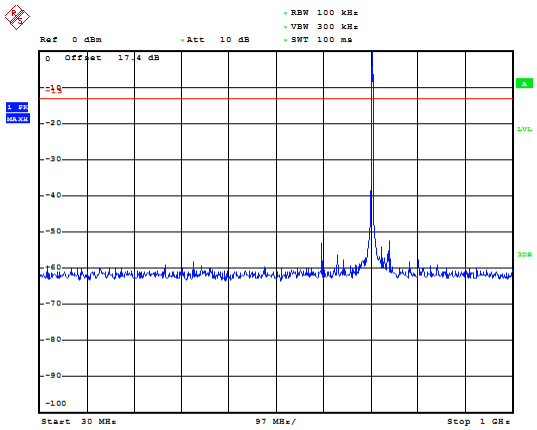
Date: 18.DEC.2018 20:47:25

LTE Band 12 5MHz CH- Middle 1GHz~9GHz



Date: 18.DEC.2018 20:28:14

LTE Band 12 5MHz CH-High 30MHz~1GHz



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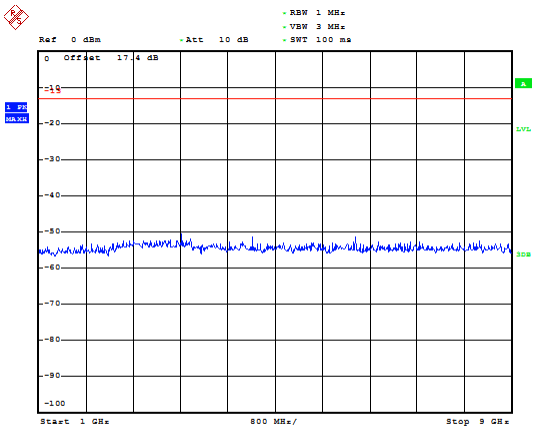
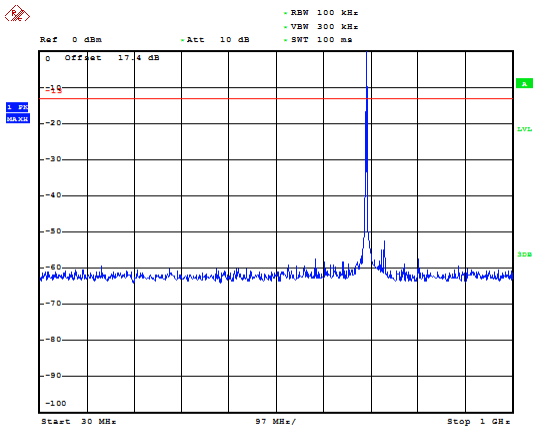
LTE Band 12 5MHz CH-High 1GHz~9GHz



Date: 18.DEC.2018 20:28:24

LTE Band 12 10MHz CH-Low 30MHz~1GHz



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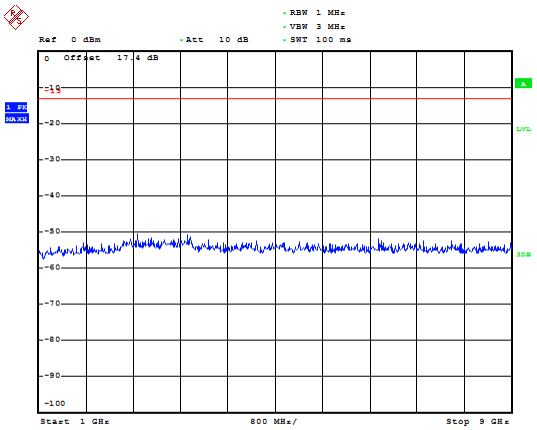
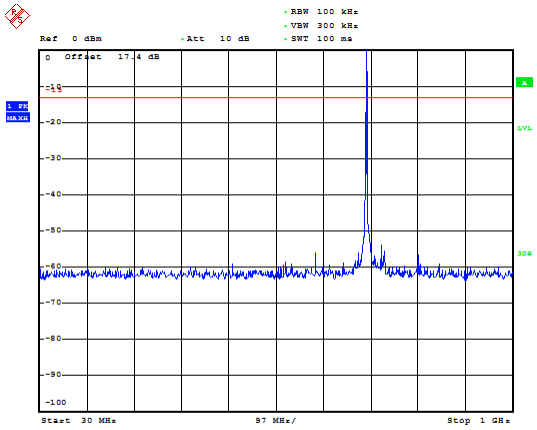
LTE Band 12 10MHz CH-Low 1GHz~9GHz



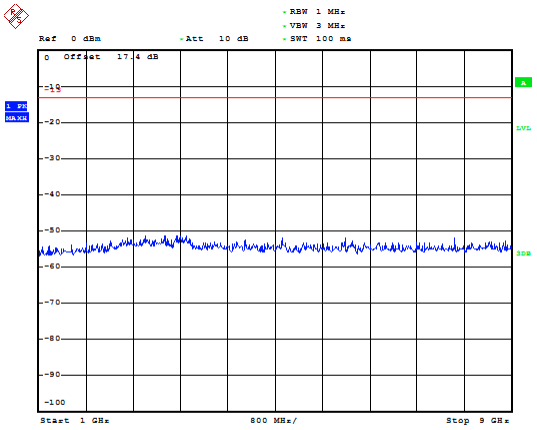
Date: 18.DEC.2018 20:41:33

LTE Band 12 10MHz CH- Middle 30MHz~1GHz



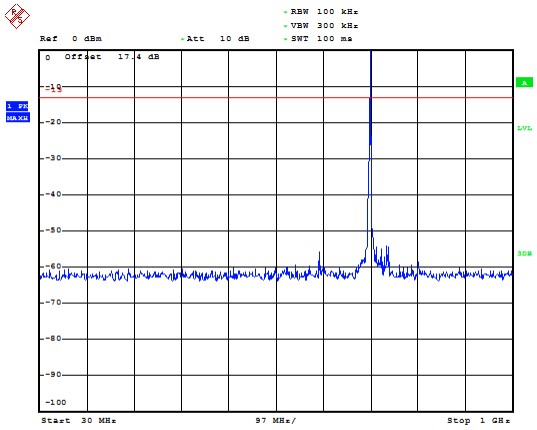
Date: 18.DEC.2018 20:44:32

LTE Band 12 10MHz CH- Middle 1GHz~9GHz



Date: 18.DEC.2018 20:41:42

LTE Band 12 10MHz CH-High 30MHz~1GHz



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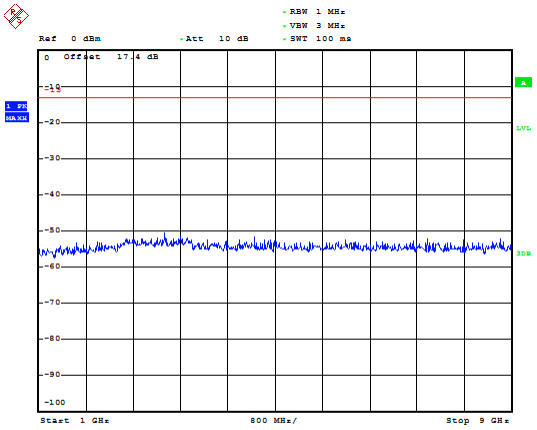
LTE Band 12 10MHz CH-High 1GHz~9GHz



Date: 18.DEC.2018 20:41:55

5.8 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

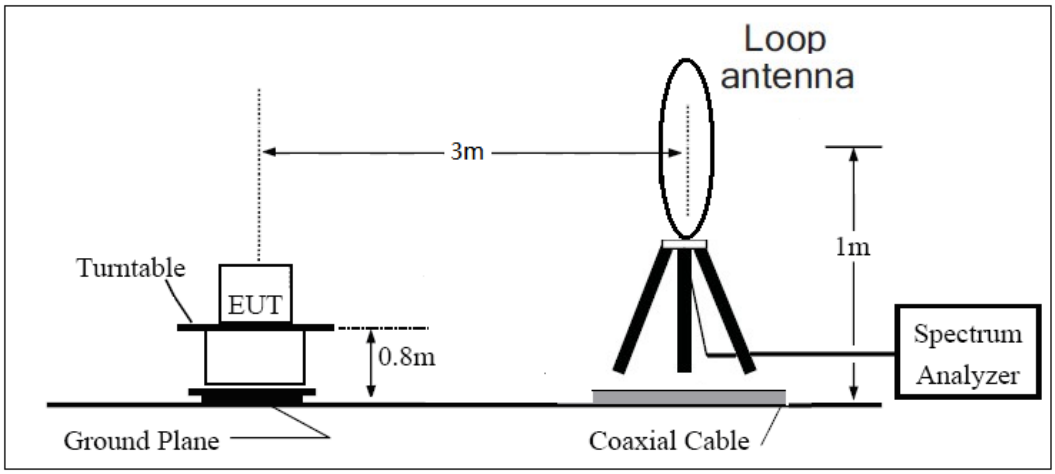
1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable 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:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + 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-2.15dBi.

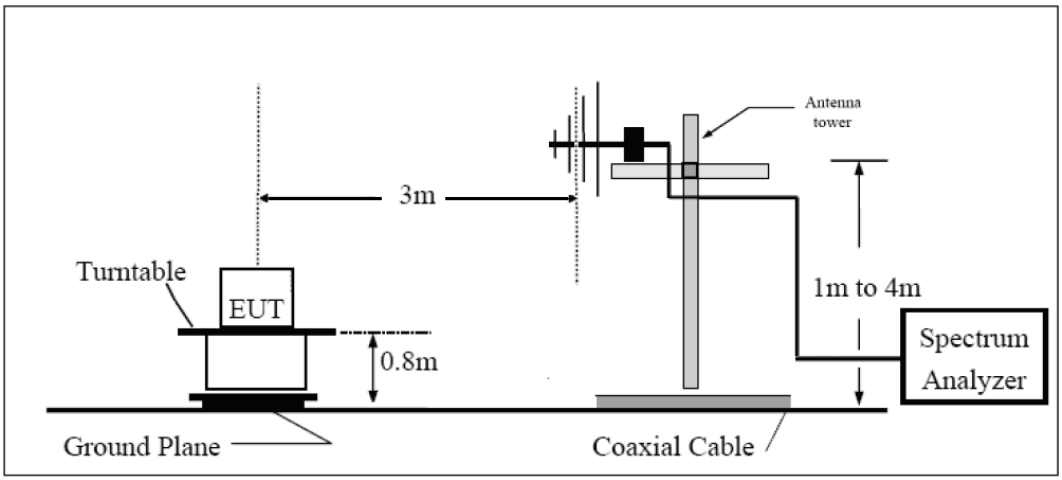
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

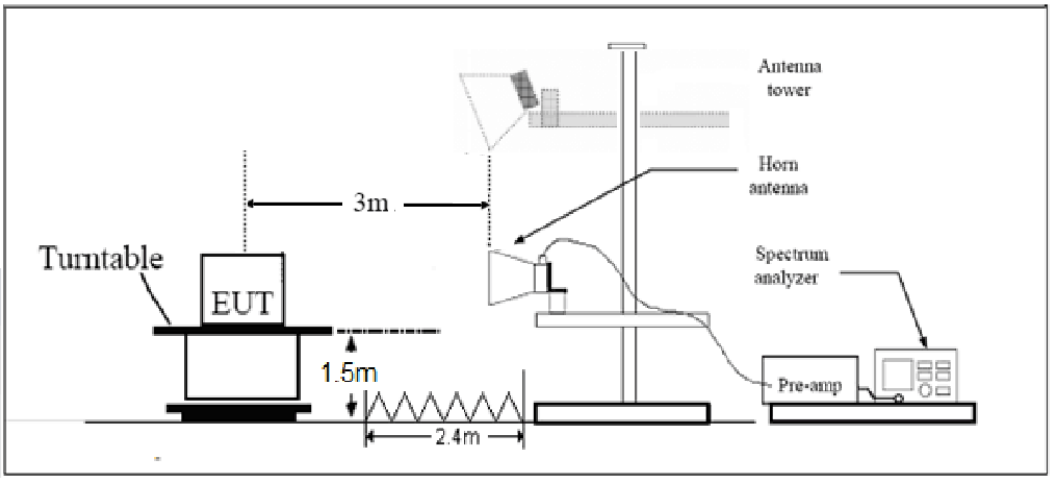
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

LTE -4 Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.”

LTE -12 Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, 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. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53 (h)/(g) Limit	-13 dBm

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 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 4 QPSK 20MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3440.0	-33.90	2.6	10.15	Horizontal	-26.35	-13.00	13.35	315
3	5133.4	-23.26	2.4	11.35	Horizontal	-14.31	-13.00	1.31	135
4	6880.0	-52.53	4.5	10.85	Horizontal	-46.18	-13.00	33.18	90
5	8600.0	-55.36	5.1	11.35	Horizontal	-49.11	-13.00	36.11	225
6	10320.0	-53.36	5.3	11.95	Horizontal	-46.71	-13.00	33.71	45
7	12040.0	-53.87	5.5	13.55	Horizontal	-45.82	-13.00	32.82	135
8	13760.0	-51.42	6.3	13.75	Horizontal	-43.97	-13.00	30.97	315
9	15480.0	-54.51	6.7	13.85	Horizontal	-47.36	-13.00	34.36	135
10	17200.0	-50.79	6.8	14.25	Horizontal	-43.34	-13.00	30.34	315
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 4 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-35.92	2.6	10.75	Horizontal	-27.77	-13.00	14.77	135
3	5170.9	-27.94	2.4	11.05	Horizontal	-19.29	-13.00	6.29	90
4	6930.0	-51.77	4.5	11.15	Horizontal	-45.12	-13.00	32.12	225
5	8662.5	-54.10	5.1	11.35	Horizontal	-47.85	-13.00	34.85	135
6	10395.0	-51.35	5.3	11.95	Horizontal	-44.70	-13.00	31.70	45
7	12127.5	-52.92	5.5	13.55	Horizontal	-44.87	-13.00	31.87	135
8	13860.0	-51.70	6.3	13.75	Horizontal	-44.25	-13.00	31.25	315
9	15592.5	-53.58	6.7	13.85	Horizontal	-46.43	-13.00	33.43	135
10	17325.0	-50.32	6.8	14.25	Horizontal	-42.87	-13.00	29.87	90
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 4 QPSK 20MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3490.0	-38.09	2.6	10.15	Horizontal	-30.54	-13.00	17.54	180
3	5208.4	-24.32	2.4	11.05	Horizontal	-15.67	-13.00	2.67	135
4	6980.0	-53.87	4.5	11.15	Horizontal	-47.22	-13.00	34.22	225
5	8725.0	-52.73	5.1	11.35	Horizontal	-46.48	-13.00	33.48	315
6	10470.0	-53.24	5.3	11.95	Horizontal	-46.59	-13.00	33.59	270
7	12215.0	-53.22	5.5	13.55	Horizontal	-45.17	-13.00	32.17	135
8	13960.0	-52.23	6.3	13.75	Horizontal	-44.78	-13.00	31.78	45
9	15705.0	-53.90	6.7	13.85	Horizontal	-46.75	-13.00	33.75	135
10	17450.0	-50.54	6.8	14.25	Horizontal	-43.09	-13.00	30.09	315
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 12 QPSK 10MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1408.0	-43.07	2.00	10.15	Horizontal	-34.92	-13.00	21.92	90
3	2112.0	-30.32	2.51	11.35	Horizontal	-21.48	-13.00	8.48	180
4	2816.0	-49.55	4.20	10.85	Horizontal	-42.90	-13.00	29.90	315
5	3520.0	-45.48	5.20	11.35	Horizontal	-39.33	-13.00	26.33	270
6	4224.0	-49.57	5.50	11.95	Horizontal	-43.12	-13.00	30.12	135
7	4928.0	-61.64	5.70	13.55	Horizontal	-53.79	-13.00	40.79	45
8	5632.0	-61.21	6.30	13.75	Horizontal	-53.76	-13.00	40.76	135
9	6336.0	-59.22	6.80	13.85	Horizontal	-52.17	-13.00	39.17	315
10	7040.0	-56.08	6.90	14.25	Horizontal	-48.73	-13.00	35.73	135
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 12 QPSK 10MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-41.23	2.00	10.75	Horizontal	-32.48	-13.00	19.48	135
3	2122.5	-22.48	2.51	11.05	Horizontal	-13.94	-13.00	0.94	90
4	2830.0	-52.38	4.20	11.15	Horizontal	-45.43	-13.00	32.43	180
5	3537.5	-48.65	5.20	11.15	Horizontal	-42.70	-13.00	29.70	315
6	4245.0	-48.82	5.50	11.95	Horizontal	-42.37	-13.00	29.37	135
7	4952.5	-61.34	5.70	13.55	Horizontal	-53.49	-13.00	40.49	90
8	5660.0	-60.63	6.30	13.75	Horizontal	-53.18	-13.00	40.18	180
9	6367.5	-58.97	6.80	13.85	Horizontal	-51.92	-13.00	38.92	315
10	7075.0	-55.59	6.90	14.25	Horizontal	-48.24	-13.00	35.24	135
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 12 QPSK 10MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1422.0	-38.65	2.00	10.15	Horizontal	-30.50	-13.00	17.50	135
3	2133.0	-26.07	2.51	11.05	Horizontal	-17.53	-13.00	4.53	225
4	2844.0	-51.41	4.20	11.15	Horizontal	-44.46	-13.00	31.46	315
5	3555.0	-49.22	5.20	11.15	Horizontal	-43.27	-13.00	30.27	90
6	4266.0	-48.20	5.50	11.95	Horizontal	-41.75	-13.00	28.75	180
7	4977.0	-60.61	5.70	13.55	Horizontal	-52.76	-13.00	39.76	135
8	5688.0	-60.94	6.30	13.75	Horizontal	-53.49	-13.00	40.49	45
9	6399.0	-58.90	6.80	13.85	Horizontal	-51.85	-13.00	38.85	180
10	7110.0	-55.94	6.90	14.25	Horizontal	-48.59	-13.00	35.59	315
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.									

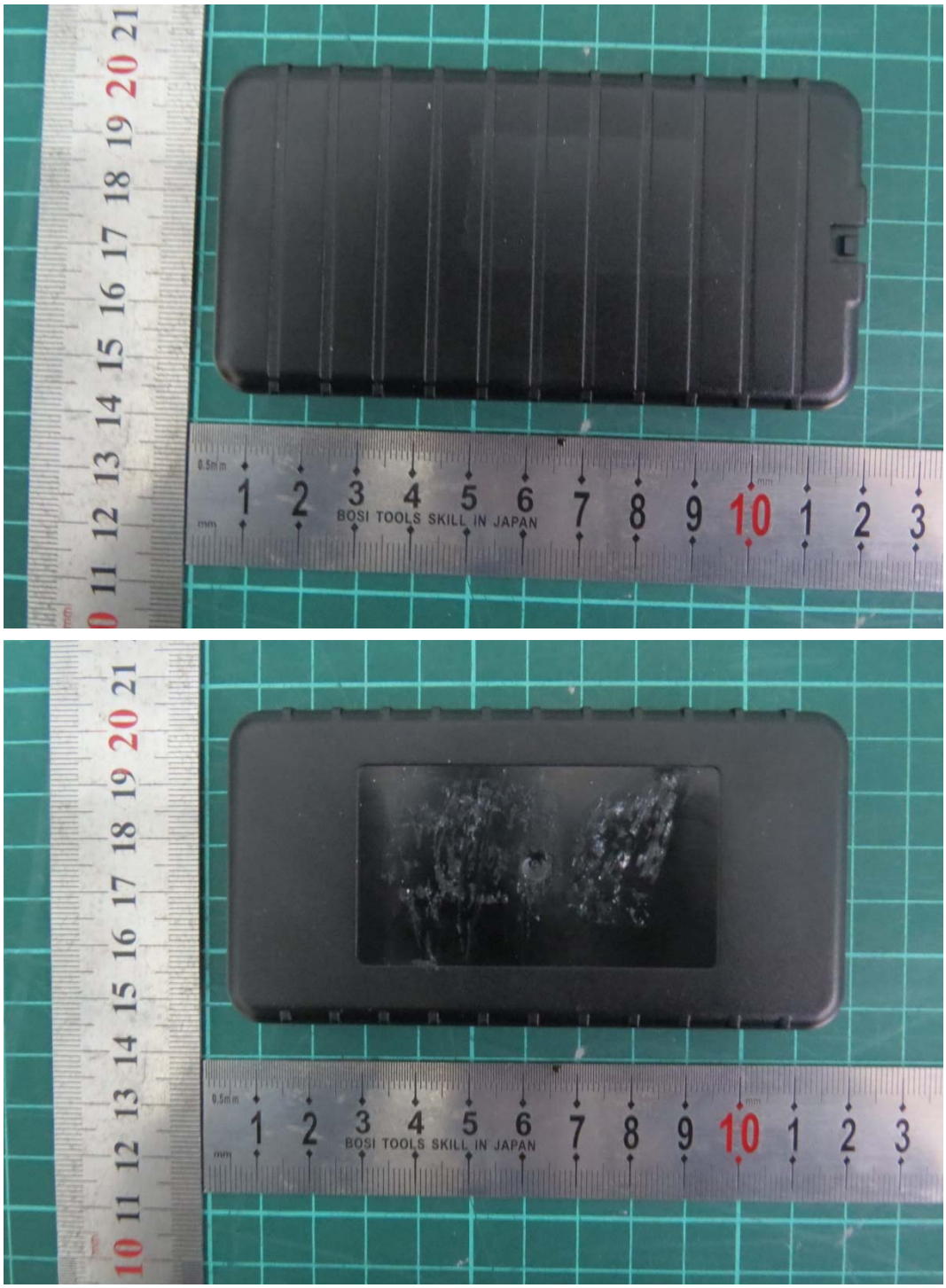
6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2019-11-17
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
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preampflier	R&S	SCU18	102327	2018-05-20	2019-05-19
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-21	2019-05-20
RF Cable	Agilent	SMA 15cm	0001	/	/
Software	R&S	EMC32	9.26.0	/	/

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

ANNEX A: EUT Appearance and Test Setup

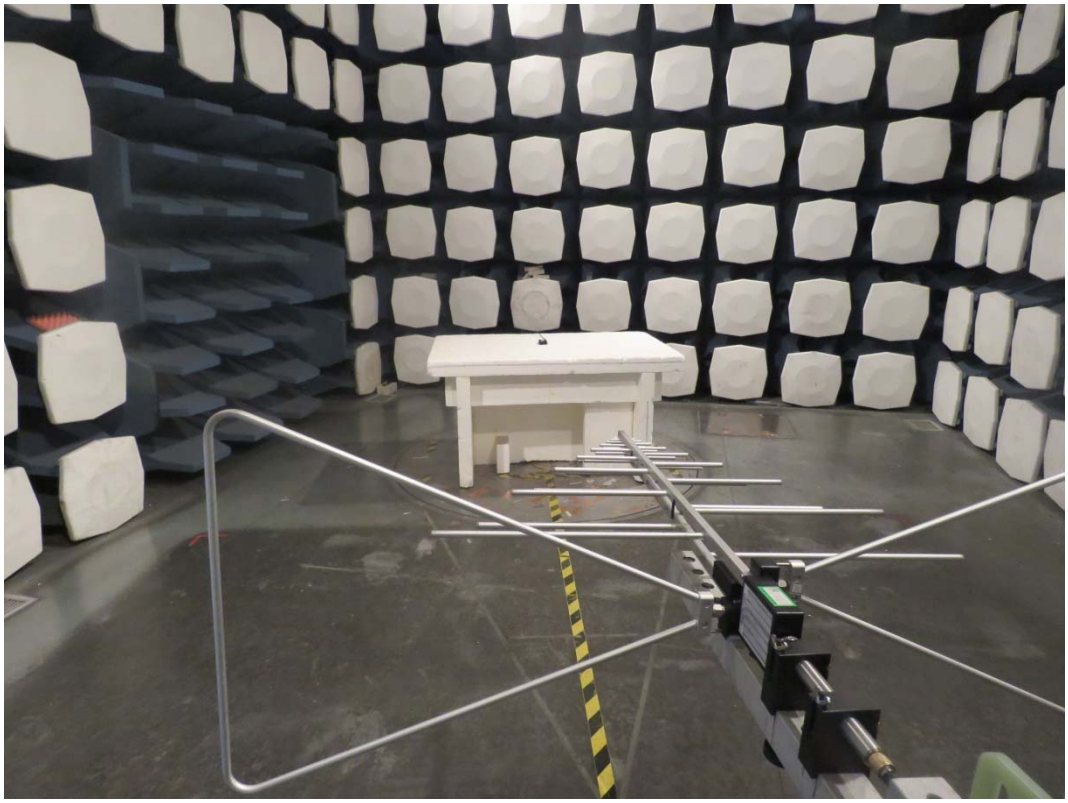
A.1 EUT Appearance

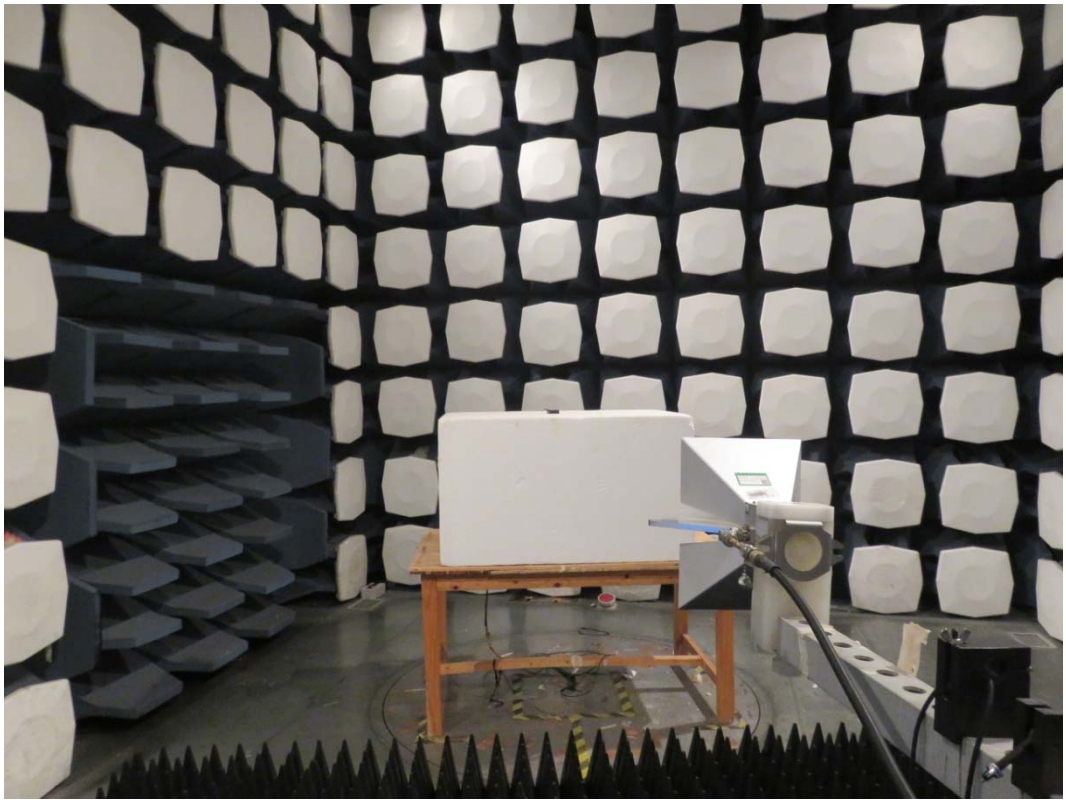


a: EUT

Picture 1 EUT and Accessory

A.2 Test Setup





Picture 2: Radiated Spurious Emissions Test setup