

**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC TEST REPORT**FCC Part 22H/24E/27/90****Report Reference No.....: GTS20181224005-1-19****FCC ID.....: 2AU3C-B1**

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Date of issue.....: Nov. 21,2019

Representative Laboratory Name ..: Shenzhen Global Test Service Co.,Ltd.

Address.....: No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Applicant's name ..: RFinder.LLC

Address ..: 455 sunrise highway West Islip New York 11795 USA.

Test specification ..:

Standard ..: **FCC CFR Title 47 Part 2, Part 22H, Part 24E,Part 27,Part 90
EIA/TIA 603-D: 2010
KDB 971168 D01**

TRF Originator ..: Shenzhen Global Test Service Co.,Ltd..

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Test item description ..: RFinder B1

Trade Mark ..: N/A

Manufacturer ..: Shenzhen Tinfull Technology Co.,Ltd.

Model/Type reference.....: B1

Listed Models ..: N/A

Modulation Type ..: QPSK, 16QAM

Rating ..: DC 7.6V by Battery
Recharged by DC 8.7V/1.8A Adapter

Hardware version ..: DT863-MB-V0.4

Software version ..: N/A

Result.....: **PASS**

TEST REPORT

Test Report No. :	GTS20181224005-1-19	Nov. 21,2019
		Date of issue

Equipment under Test : RFinder B1

Model /Type : B1

Listed Models : N/A

Applicant : **RFinder.LLC**

Address : 455 sunrise highway West Islip New York 11795 USA.

Manufacturer : **Shenzhen Tinfull Technology Co.,Ltd.**

Address : Floor 6&8,C1 Plant, changfang Industrial Park, julong mountain No.3 road, dagongyeyuan, longtian street, Pingshan District, Shenzhen,China.

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 4.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1	SUMMARY	4
1.1	TEST STANDARDS.....	4
1.2	TEST DESCRIPTION	4
1.3	TEST FACILITY	5
1.4	STATEMENT OF THE MEASUREMENT UNCERTAINTY	5
2	GENERAL INFORMATION	6
2.1	GENERAL REMARKS	6
2.2	PRODUCT DESCRIPTION	6
2.3	EQUIPMENT UNDER TEST.....	8
2.4	ENVIRONMENTAL CONDITIONS	8
2.5	DESCRIPTION OF TEST MODES	8
2.6	BLOCK DIAGRAM OF TEST SETUP	8
2.7	SPECIAL ACCESSORIES.....	8
2.8	RELATED SUBMITTAL(s) / GRANT (s).....	8
2.9	MODIFICATIONS.....	8
2.10	EQUIPMENTS USED DURING THE TEST	9
3	TEST CONDITIONS AND RESULTS	10
3.1	OUTPUT POWER	10
3.2	PEAK-TO-AVERAGE RATIO (PAR)	31
3.3	OCCUPIED BANDWIDTH AND EMISSION BANDWIDTH.....	33
3.4	BAND EDGE COMPLIANCE	36
3.5	SPURIOUS EMISSION	41
3.6	FREQUENCY STABILITY UNDER TEMPERATURE & VOLTAGE VARIATIONS.....	50
4	TEST SETUP PHOTOS OF THE EUT	64
5	EXTERNAL AND INTERNAL PHOTOS OF THE EUT	64

1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 22](#) : PUBLIC MOBILE SERVICES

[FCC Part 24](#) : PERSONAL COMMUNICATIONS SERVICES

[FCC Part 27](#) : MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

[FCC Part 90](#) : PRIVATE LAND MOBILE RADIO SERVICES

[TIA/EIA 603 D June 2010](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: - Unintentional Radiators

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[KDB971168 D01: v02r02](#) MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS

[ANSI C63.4:2009](#): Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 Part 22.913(a) Part 24.232(c) Part 27.50 Part 90.635	Pass
Peak-to-Average Ratio	n/a	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 Part 24.238 Part 27.53 Part 90.691	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917(b) Part 24.238 Part 27.53 Part 90.691	Pass
Out of band emission, Band Edge	Part 2.1051 Part 22.917(b) Part 22.917(b) Part 24.238 Part 27.53 Part 90.691	Pass
Frequency stability	Part 2.1055 Part 22.355 Part 24.235 Part 27.54 Part 90.213	Pass

1.3 Test Facility

1.3.1 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Global Test Service Co.,Ltd.** quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for **Shenzhen Global Test Service Co.,Ltd.** is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 General Remarks

Date of receipt of test sample	:	Oct. 15, 2019
Testing commenced on	:	Oct. 15, 2019
Testing concluded on	:	Nov.21,2019

2.2 Product Description

Product Name	RFinder B1
Trade Mark	N/A
Model/Type reference	B1
List Model	N/A
Model Declaration	N/A
Power supply:	DC 7.6V by Battery Recharged by DC 8.7V/1.8A Adapter
2G	
Support Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
Release Version	R99
GPRS Class	Class 12
EGPRS Class	Class 12
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
Type Of Modulation	GMSK for GSM/GPRS; GMSK/8PSK for EGPRS
Antenna Description	PIFA Antenna; -5.0dBi (max.) For GSM 850; -3.0dBi (max.) For DCS 1900;
3G	
UMTS Operation Frequency Band	UMTS FDD Band II/V
WCDMA Release Version	R6
HSDPA Release Version	Release 6
HSUPA Release Version	Release 6
Modulation Type	QPSK for UMTS
Antenna Description	PIFA Antenna; -3.0dBi (max.) For WCDMA Band II; -5.0dBi (max.) For WCDMA Band V
LTE	
LTE Operation Frequency Band	LTE Band 2, 4, 5, 7,12,17, 26, 38, 41
LTE Release Version	R9
Type Of Modulation	QPSK/16QAM
Antenna Description	PIFA Antenna; -3.0dBi (max.) For Band 2;-3.0dBi (max.) For Band 4; -5.0dBi (max.) For Band 5;-3.0dBi (max.) For Band 7;

	-5.0dBi (max.) For Band 12;-5.0dBi (max.) For Band 17; -3.0dBi (max.) For Band 26;-3.0dBi (max.) For Band 38 -3.0dBi (max.) For Band 41
Bluetooth	
Frequency Range	2402MHz ~ 2480MHz
Channel Number	79 channels for Bluetooth V4.0 (BDR/EDR) 40 channels for Bluetooth V4.0 (BT LE)
Channel Spacing	1MHz for Bluetooth V4.0 (BDR/EDR) 2MHz for Bluetooth V4.0 (BT LE)
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8-DPSK for Bluetooth V4.0 (BDR/EDR) GFSK for Bluetooth V4.0 (BT LE)
Bluetooth Version	V4.0
Antenna Description	PIFA Antenna, -1.2dBi (Max.)
WIFI(2.4G Band)	
Frequency Range	2412MHz ~ 2462MHz
Channel Spacing	5MHz
Channel Number	11 Channel for 20MHz bandwidth(2412~2462MHz) 7 channels for 40MHz bandwidth(2422~2452MHz)
Modulation Type	802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	PIFA Antenna, -1.2dBi (Max.)
WIFI(5.2G Band)	
Frequency Range	5180MHz ~ 5240MHz
Channel Number	4 channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz)
Modulation Type	802.11a/n/ac: OFDM
Antenna Description	PIFA Antenna, -1.4dBi (Max.)
WIFI (5.8G Band)	
Frequency Range	5745MHz ~ 5825MHz
Channel Number	5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz)
Modulation Type	802.11a/n/ac: OFDM
Antenna Description	PIFA Antenna, -1.4dBi (Max.)
PMR	
Frequency Range	VHF:136MHz to 174 MHz;UHF:400MHz to 470MHz
Channel Separation	Analog Voice 12.5KHz Digital Voice 12.5KHz
Modulation Type	FM for Analog Voice FSK for Digital Voice
Channel Bandwidth	12.5 KHz
Rate Power	4W/2W
Antenna Description	External Antenna, 1.8dBi (Max.)
RFID(13.56MHz)	
Frequency Range	13.56MHz
Channel Number	1
Modulation Type	ASK
Antenna Description	PIFA Antenna, -1.20dBi (Max.)
GPS Receiver	Support and only RX

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	☐	230V / 50 Hz	☐	120V / 60Hz
		☐	12 V DC	☐	24 V DC
		☒	Other (specified in blank below)		

DC 7.6V form battery

2.4 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

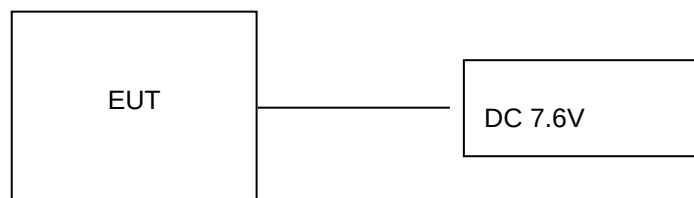
2.5 Description of Test Modes

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Note:

1. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst result on this report.
2. Test method and refer to 3GPP TS136521.

2.6 Block Diagram of Test Setup



2.7 Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
ShenZhen Tinfull Technology Co.,Ltd	Adapter	STK018-08718T	--	SDOC

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with of the FCC Part 22,Part 24,Part 27,Part 90 Rules.

2.9 Modifications

No modifications were implemented to meet testing criteria.

2.10 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2019/09/20	2020/09/19
LISN	R&S	ESH2-Z5	893606/008	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESPI3	101841-cd	2019/09/20	2020/09/19
EMI Test Receiver	R&S	ESCI7	101102	2019/09/20	2020/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2019/09/20	2020/09/19
Spectrum Analyzer	R&S	FSV40	100019	2019/09/20	2020/09/19
Vector Signal generator	Agilent	N5181A	MY49060502	2019/09/20	2020/09/19
Signal generator	Agilent	E4421B	3610AO1069	2019/09/20	2020/09/19
Climate Chamber	ESPEC	EL-10KA	A20120523	2019/09/20	2020/09/19
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2019/09/23	2020/09/22
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2019/10/12	2020/10/11
Bilog Antenna	Schwarzbeck	VULB9163	000976	2019/05/26	2020/05/25
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2019/09/20	2020/09/19
Amplifier	Schwarzbeck	BBV9179	9719-025	2019/09/20	2020/09/19
Amplifier	EMCI	EMC051845B	980355	2019/09/20	2020/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2019/09/20	2020/09/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2019/09/20	2020/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2019/09/20	2020/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2019/09/20	2020/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2019/09/20	2020/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2019/09/20	2020/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2019/09/20	2020/09/19
Test Control Unit	Tonscend	JS0806-1	178060067	2019/06/20	2020/06/19
Automated filter bank	Tonscend	JS0806-F	19F8060177	2019/06/20	2020/06/19
Universal Radio Communication	R&S	CMU200	114353	2019/09/20	2020/09/19
Wireless Communication Tester	R&S	CMW500	125408	2019/09/20	2020/09/19
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

3 TEST CONDITIONS AND RESULTS

3.1 Output Power

LIMIT

According to § 22.913(a) specifies " The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5 and Band 26.

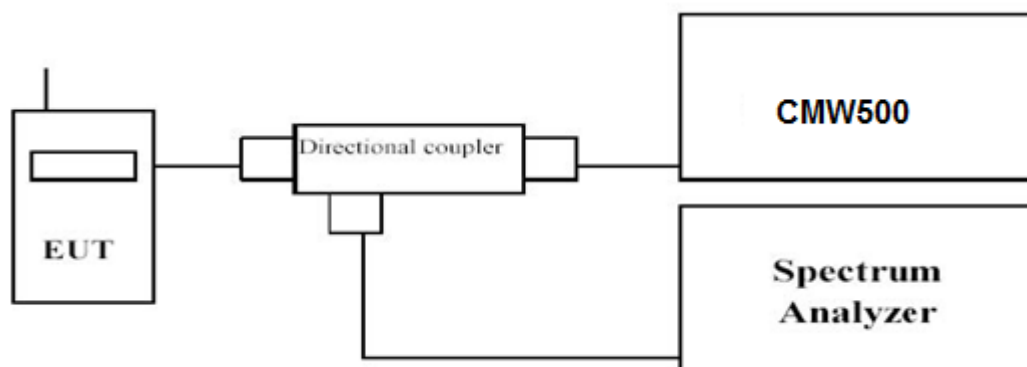
The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12 and Band 17.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2 and Band 7 and Band 38 and Band 41.

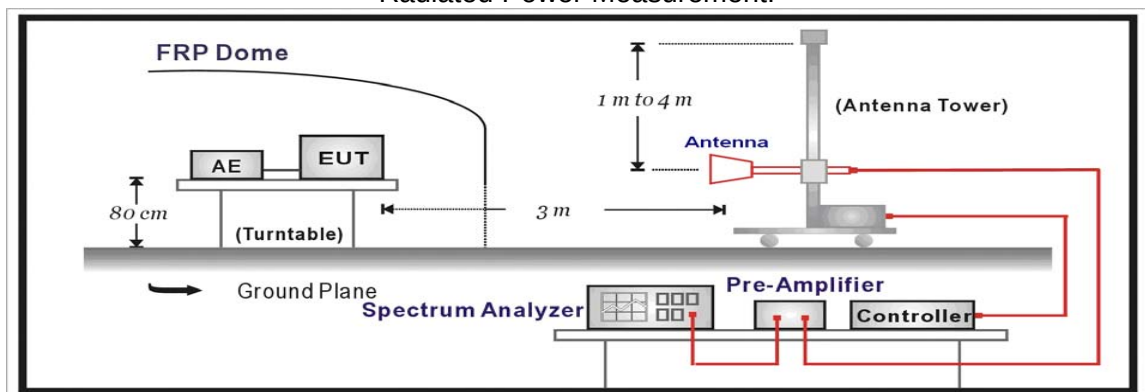
The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4 .

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.

- d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q. Test site anechoic chamber refer to ANSI C63.26.

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

Conducted Measurement:

Cellular Band & PCS Band

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Cellular	128	31.84	31.56	29.75	28.32	26.61	25.19	25.11	24.32	23.69
	190	31.75	31.54	29.95	28.44	26.75	25.06	24.94	24.15	23.46
	251	31.63	31.63	29.87	28.45	26.94	24.95	24.85	24.29	23.57
PCS	512	29.69	29.77	28.02	26.54	24.57	24.29	24.03	23.91	23.14
	661	29.88	29.75	28.05	26.74	24.61	24.35	24.19	24.04	23.11
	810	29.74	29.65	28.03	26.69	24.79	24.12	23.97	23.85	22.97

WCDMA Band II

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.03	4.46	21.35	3.88	21.79	3.53
HSDPA	1	20.85	4.62	20.15	4.68	20.36	4.68
	2	20.72	4.68	20.54	4.31	20.46	4.52
	3	20.81	4.40	20.86	4.89	20.60	4.81
	4	20.40	4.33	20.57	4.49	20.77	4.73
HSUPA	1	20.70	5.99	20.55	6.79	20.26	6.25
	2	20.48	5.65	20.67	6.01	20.57	6.08
	3	20.70	5.67	20.36	5.67	20.60	5.86
	4	20.87	6.00	20.42	5.84	20.89	5.79
	5	20.75	5.80	20.81	6.17	20.70	5.67
HSPA+	1	20.72	5.88	20.68	5.97	20.82	5.87

WCDMA Band V

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.89	3.49	22.91	3.37	22.96	3.56
HSDPA	1	21.74	4.42	21.81	4.55	21.88	4.55
	2	20.68	4.27	20.42	4.24	20.70	4.60
	3	20.76	4.07	20.59	4.08	20.65	4.39
	4	20.79	4.54	20.44	4.25	20.59	4.21
HSUPA	1	21.58	5.77	21.88	5.38	21.95	6.38
	2	20.59	5.80	20.68	5.07	20.48	5.83
	3	20.36	5.27	20.47	5.43	20.74	6.27
	4	20.55	5.55	20.39	5.04	20.46	6.20
	5	20.61	5.81	20.72	5.25	20.39	6.42
HSPA+	1	20.64	5.69	20.76	5.26	20.76	6.41

LTE FDD Band 2				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	1850.7	22.31	21.86
		1880	22.23	21.62
		1909.3	22.15	21.36
	1 RB high	1850.7	21.37	20.36
		1880	22.01	21.16
		1909.3	21.83	21.17
	50% RB mid	1850.7	21.94	21.16
		1880	21.04	20.11
		1909.3	21.88	21.13
	100% RB	1850.7	21.99	21.22
		1880	21.90	21.12
		1909.3	21.01	20.99
3 MHz	1 RB low	1851.5	22.59	21.84
		1880	22.29	21.68
		1908.5	21.41	20.53
	1 RB high	1851.5	21.36	20.37
		1880	21.90	21.10
		1908.5	21.35	20.57
	50% RB mid	1851.5	20.87	20.16
		1880	20.99	20.04
		1908.5	21.95	21.09
	100% RB	1851.5	21.94	21.00
		1880	20.91	20.97
		1908.5	20.91	20.99
5 MHz	1 RB low	1852.5	22.84	22.14
		1880	22.51	21.97
		1907.5	21.68	20.81
	1 RB high	1852.5	21.64	20.68
		1880	22.19	21.48
		1907.5	21.56	21.09
	50% RB mid	1852.5	20.82	20.12
		1880	20.96	20.20
		1907.5	21.97	21.46
	100% RB	1852.5	22.02	21.44
		1880	20.96	20.31
		1907.5	20.92	20.99
10 MHz	1 RB low	1855	22.66	22.04
		1880	22.19	21.48
		1905	21.57	20.59
	1 RB high	1855	21.53	20.54
		1880	22.24	21.64
		1905	20.98	20.38
	50% RB mid	1855	21.06	20.33
		1880	21.17	20.38
		1905	21.19	20.65
	100% RB	1855	21.95	21.26
		1880	20.98	20.99
		1905	21.09	20.37
15 MHz	1 RB low	1857.5	21.86	22.27
		1880	21.79	22.83
		1902.5	22.27	21.19
	1 RB high	1857.5	21.17	21.39
		1880	21.45	20.93
		1902.5	22.61	22.05
	50% RB mid	1857.5	21.58	21.73

	100% RB	1880	20.96	22.32
		1902.5	21.07	21.89
		1857.5	22.55	22.07
		1880	21.70	21.91
		1902.5	21.78	21.07
20 MHz	1 RB low	1860	21.51	21.54
		1880	20.62	21.04
		1900	22.82	21.09
	1 RB high	1860	21.67	20.74
		1880	22.31	22.51
		1900	22.54	22.51
	50% RB mid	1860	21.85	22.14
		1880	21.51	20.84
		1900	22.62	22.51
	100% RB	1860	21.65	22.49
		1880	21.35	21.78
		1900	22.06	21.51

LTE FDD Band 4				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	1710.7	21.35	20.91
		1732.5	20.84	21.38
		1754.3	21.77	22.80
	1 RB high	1710.7	21.12	22.62
		1732.5	22.32	21.30
		1754.3	21.39	20.78
	50% RB mid	1710.7	21.85	22.78
		1732.5	21.82	22.15
		1754.3	21.49	21.03
	100% RB	1710.7	20.85	21.20
		1732.5	22.30	21.68
		1754.3	20.51	22.04
3 MHz	1 RB low	1711.5	21.52	22.23
		1732.5	21.37	21.82
		1753.5	21.34	21.49
	1 RB high	1711.5	21.98	21.58
		1732.5	21.37	21.26
		1753.5	21.27	22.07
	50% RB mid	1711.5	21.47	21.44
		1732.5	20.75	21.39
		1753.5	22.13	22.45
	100% RB	1711.5	22.18	22.08
		1732.5	22.68	21.67
		1753.5	22.27	22.16
5 MHz	1 RB low	1712.5	21.89	21.37
		1732.5	20.69	21.27
		1752.5	21.28	22.74
	1 RB high	1712.5	21.90	21.35
		1732.5	21.24	21.33
		1752.5	21.13	21.59
	50% RB mid	1712.5	22.32	21.85
		1732.5	22.00	21.46
		1752.5	20.98	22.36
	100% RB	1712.5	21.79	21.65
		1732.5	22.30	21.19
		1752.5	21.36	22.01

10 MHz	1 RB low	1715	21.97	22.36
		1732.5	22.29	21.72
		1750	21.53	22.06
	1 RB high	1715	20.78	21.68
		1732.5	21.32	22.68
		1750	21.66	22.37
	50% RB mid	1715	22.11	21.79
		1732.5	20.86	20.94
		1750	20.76	22.07
	100% RB	1715	21.55	21.30
		1732.5	21.94	21.62
		1750	21.86	21.19
15 MHz	1 RB low	1707.5	22.51	21.22
		1732.5	21.24	21.48
		1747.5	21.30	22.20
	1 RB high	1707.5	21.31	21.36
		1732.5	22.03	20.82
		1747.5	21.03	22.19
	50% RB mid	1707.5	21.17	22.70
		1732.5	21.83	22.48
		1747.5	22.34	22.03
	100% RB	1707.5	21.74	21.19
		1732.5	22.20	21.49
		1747.5	21.02	20.72
20 MHz	1 RB low	1720	21.55	21.28
		1732.5	21.96	21.53
		1745	21.34	21.66
	1 RB high	1720	21.32	20.96
		1732.5	21.58	20.62
		1745	21.07	21.98
	50% RB mid	1720	21.44	21.36
		1732.5	21.39	21.21
		1745	21.73	22.35
	100% RB	1720	22.05	21.85
		1732.5	21.25	21.84
		1745	21.67	21.48

LTE FDD Band 5				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	824.7	22.31	21.86
		836.5	22.23	21.62
		848.3	22.15	21.36
	1 RB high	824.7	21.37	20.36
		836.5	22.01	21.16
		848.3	21.83	21.17
	50% RB mid	824.7	21.94	21.16
		836.5	21.04	20.11
		848.3	21.88	21.13
	100% RB	824.7	21.99	21.22
		836.5	21.90	21.12
		848.3	21.01	20.99
3 MHz	1 RB low	825.5	22.59	21.84
		836.5	22.29	21.68
		847.5	21.41	20.53
	1 RB high	825.5	21.36	20.37
		836.5	21.90	21.10
		847.5	21.35	20.57
	50% RB mid	825.5	20.87	20.16
		836.5	20.99	20.04
		847.5	21.95	21.09
	100% RB	825.5	21.94	21.00
		836.5	20.91	20.97
		847.5	20.91	20.99
5 MHz	1 RB low	826.5	22.84	22.14
		836.5	22.51	21.97
		846.5	21.68	20.81
	1 RB high	826.5	21.64	20.68
		836.5	22.19	21.48
		846.5	21.56	21.09
	50% RB mid	826.5	20.82	20.12
		836.5	20.96	20.20
		846.5	21.97	21.46
	100% RB	826.5	22.02	21.44
		836.5	20.96	20.31
		846.5	20.92	20.99
10 MHz	1 RB low	829	22.66	22.04
		836.5	22.19	21.48
		844	21.57	20.59
	1 RB high	829	21.53	20.54
		836.5	22.24	21.64
		844	20.98	20.38
	50% RB mid	829	21.06	20.33
		836.5	21.17	20.38
		844	21.19	20.65
	100% RB	829	21.95	21.26
		836.5	20.98	20.99
		844	21.09	20.37

LTE FDD Band 7				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
5 MHz	1 RB low	2502.5	20.63	22.18
		2535	21.59	21.12
		2567.5	21.89	22.48
	1 RB high	2502.5	21.66	21.19
		2535	21.11	20.82
		2567.5	21.33	21.01
	50% RB mid	2502.5	21.41	22.57
		2535	20.63	21.47
		2567.5	21.37	22.22
	100% RB	2502.5	21.47	21.60
		2535	21.63	21.73
		2567.5	21.63	21.38
10 MHz	1 RB low	2505	22.07	22.19
		2535	21.51	20.96
		2565	22.08	21.30
	1 RB high	2505	21.56	22.47
		2535	21.75	22.07
		2565	21.20	21.79
	50% RB mid	2505	21.78	21.98
		2535	21.86	22.08
		2565	21.13	22.45
	100% RB	2505	21.55	21.41
		2535	21.03	22.27
		2565	21.91	21.84
15 MHz	1 RB low	2507.5	21.83	21.53
		2535	21.77	21.27
		2562.5	21.40	21.52
	1 RB high	2507.5	21.87	21.41
		2535	21.43	21.36
		2562.5	22.42	20.91
	50% RB mid	2507.5	22.05	20.74
		2535	22.72	22.42
		2562.5	20.70	21.05
	100% RB	2507.5	21.31	21.85
		2535	21.80	22.46
		2562.5	21.70	20.72
20 MHz	1 RB low	2510	22.43	21.87
		2532.5	20.91	21.32
		2560	21.74	21.04
	1 RB high	2510	21.20	20.79
		2532.5	21.66	22.13
		2560	20.70	21.32
	50% RB mid	2510	22.05	22.01
		2532.5	21.47	21.39
		2560	22.37	22.35
	100% RB	2510	21.48	21.32
		2532.5	21.98	21.15
		2560	22.31	21.30

LTE FDD Band 12				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	699.7	20.79	21.83
		707.5	21.68	22.38
		715.3	20.91	22.18
	1 RB high	699.7	20.59	21.79
		707.5	22.35	21.95
		715.3	20.86	22.62
	50% RB mid	699.7	21.44	20.70
		707.5	21.84	22.07
		715.3	21.49	21.67
	100% RB	699.7	21.64	21.51
		707.5	22.56	21.16
		715.3	21.42	22.23
3 MHz	1 RB low	700.5	20.93	21.25
		707.5	21.77	22.36
		715.3	22.28	21.78
	1 RB high	700.5	22.45	22.16
		707.5	21.67	20.92
		715.3	22.25	21.41
	50% RB mid	700.5	21.78	20.83
		707.5	22.69	22.38
		715.3	21.27	21.17
	100% RB	700.5	22.61	21.66
		707.5	21.22	21.71
		715.3	21.88	22.04
5 MHz	1 RB low	701.5	22.37	21.36
		707.5	21.24	21.19
		713.5	21.36	22.36
	1 RB high	701.5	22.06	21.63
		707.5	22.42	21.77
		713.5	20.83	22.08
	50% RB mid	701.5	20.83	21.99
		707.5	22.16	21.64
		713.5	22.12	21.33
	100% RB	701.5	21.50	21.99
		707.5	22.04	21.07
		713.5	21.00	22.07
10 MHz	1 RB low	704	21.96	22.51
		707.5	21.06	21.45
		711	21.87	22.03
	1 RB high	704	20.89	21.23
		707.5	21.57	21.45
		711	21.29	22.10
	50% RB mid	704	21.72	21.95
		707.5	22.53	21.74
		711	21.03	21.70
	100% RB	704	21.75	20.98
		707.5	21.48	21.46
		711	20.58	22.19

LTE FDD Band 17				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
5 MHz	1 RB low	706.5	21.32	22.00
		710	22.25	21.99
		713.5	21.09	21.76
	1 RB high	706.5	21.43	22.46
		710	21.23	21.18
		713.5	22.17	21.95
	50% RB mid	706.5	21.35	21.60
		710	21.17	21.26
		713.5	21.68	21.90
	100% RB	706.5	22.08	22.51
		710	21.58	20.58
		713.5	22.59	20.63
10 MHz	1 RB low	709	21.33	22.19
		710	21.76	22.81
		711	22.01	22.12
	1 RB high	709	21.13	20.82
		710	22.14	21.14
		711	22.63	21.99
	50% RB mid	709	22.00	21.14
		710	21.96	20.65
		711	21.56	21.90
	100% RB	709	21.49	21.83
		710	21.93	21.75
		711	21.85	21.40

LTE FDD Band 26				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	814.7	22.33	21.50
		819.0	22.91	21.20
		823.3	22.16	21.16
	1 RB high	814.7	22.73	21.84
		819.0	22.60	21.26
		823.3	22.16	21.28
	50% RB mid	814.7	22.57	21.52
		819.0	22.14	21.14
		823.3	22.30	21.74
	100% RB	814.7	22.01	21.85
		819.0	22.38	21.67
		823.3	22.97	21.45
3 MHz	1 RB low	815.5	22.38	21.53
		819.0	22.01	21.49
		822.5	22.11	21.80
	1 RB high	815.5	22.22	21.16
		819.0	22.17	21.82
		822.5	22.62	21.42
	50% RB mid	815.5	22.17	21.11
		819.0	22.40	21.38
		822.5	22.18	21.84
	100% RB	815.5	22.88	21.65
		819.0	22.19	21.82
		822.5	22.11	21.71
5 MHz	1 RB low	816.5	22.77	21.56
		819.0	22.78	21.61
		821.5	22.07	21.89

	1 RB high	816.5	22.14	21.86
		819.0	22.66	21.60
		821.5	22.00	21.21
	50% RB mid	816.5	22.78	21.87
		819.0	22.64	21.87
		821.5	22.75	21.61
	100% RB	816.5	22.18	21.27
		819.0	22.15	21.38
		821.5	22.23	21.68
10 MHz	1 RB low	819.0	22.33	21.50
	1 RB high	819.0	22.91	21.20
	50% RB mid	819.0	22.16	21.16
	100% RB	819.0	22.73	21.84

LTE FDD Band 26				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
1.4 MHz	1 RB low	824.7	22.21	21.44
		836.5	22.05	21.42
		848.3	22.45	21.11
	1 RB high	824.7	22.41	21.11
		836.5	22.51	21.58
		848.3	22.54	21.94
	50% RB mid	824.7	22.64	21.17
		836.5	22.68	21.73
		848.3	22.30	21.61
	100% RB	824.7	22.82	21.06
		836.5	22.08	21.93
		848.3	22.71	21.41
3 MHz	1 RB low	825.5	22.34	21.57
		836.5	22.33	21.77
		847.5	22.29	21.78
	1 RB high	825.5	22.39	21.77
		836.5	22.72	21.43
		847.5	22.74	21.79
	50% RB mid	825.5	22.93	21.79
		836.5	22.88	21.65
		847.5	22.30	21.98
	100% RB	825.5	22.42	21.31
		836.5	22.30	21.47
		847.5	22.27	21.08
5 MHz	1 RB low	826.5	22.52	21.07
		836.5	22.16	21.14
		846.5	22.98	21.16
	1 RB high	826.5	22.72	21.47
		836.5	22.61	21.70
		846.5	22.29	21.56
	50% RB mid	826.5	22.04	21.81
		836.5	22.83	21.24
		846.5	22.62	21.72
	100% RB	826.5	22.75	21.75
		836.5	22.52	21.87
		846.5	22.81	21.15
10 MHz	1 RB low	829.0	22.21	21.44
		836.5	22.05	21.42
		844.0	22.45	21.11
	1 RB high	829.0	22.41	21.11
		836.5	22.51	21.58
		844.0	22.54	21.94
	50% RB mid	829.0	22.64	21.17
		836.5	22.68	21.73
		844.0	22.30	21.61

	100% RB	829.0	22.82	21.06
		836.5	22.08	21.93
		844.0	22.71	21.41
15 MHz	1 RB low	831.5	22.34	21.57
		836.5	22.33	21.77
		841.5	22.29	21.78
	1 RB high	831.5	22.39	21.77
		836.5	22.72	21.43
		841.5	22.74	21.79
	50% RB mid	831.5	22.93	21.79
		836.5	22.88	21.65
		841.5	22.30	21.98
	100% RB	831.5	22.42	21.31
		836.5	22.30	21.47
		841.5	22.27	21.08

LTE FDD Band 38				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
5 MHz	1 RB low	2572.5	21.17	20.70
		2595	21.21	21.20
		2617.5	21.31	21.24
	1 RB high	2572.5	22.32	22.44
		2595	21.85	22.26
		2617.5	20.72	21.95
	50% RB mid	2572.5	21.57	21.46
		2595	22.21	22.49
		2617.5	21.27	22.32
	100% RB	2572.5	21.74	21.32
		2595	21.08	21.43
		2617.5	21.56	21.38
10 MHz	1 RB low	2575	20.89	20.98
		2595	21.33	22.03
		2615	22.02	22.02
	1 RB high	2575	21.44	20.98
		2595	20.70	21.71
		2615	21.86	20.92
	50% RB mid	2575	21.71	21.35
		2595	21.18	20.84
		2615	22.32	22.20
	100% RB	2575	21.23	21.74
		2595	21.49	20.80
		2615	22.35	21.29
15 MHz	1 RB low	2577.5	21.43	21.90
		2595	21.72	22.12
		2612.5	21.67	21.08
	1 RB high	2577.5	21.83	21.69
		2595	21.27	22.30
		2612.5	21.79	22.27
	50% RB mid	2577.5	20.65	21.68
		2595	22.36	21.37
		2612.5	22.05	21.38
	100% RB	2577.5	21.67	21.83
		2595	21.10	21.84
		2612.5	22.29	21.42
20 MHz	1 RB low	2580	20.93	21.63
		2595	21.34	22.20
		2610	22.33	20.95
	1 RB high	2580	22.09	22.09
		2595	21.58	22.31
		2610	21.42	21.31
	50% RB mid	2580	21.95	21.81
		2595	22.27	22.55
		2610	21.69	20.63
	100% RB	2580	21.80	22.38
		2595	20.93	21.34
		2610	22.41	21.49

LTE FDD Band 41				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
5 MHz	1 RB low	2552.5	21.53	22.69
		2605	20.83	22.01
		2652.5	21.52	20.85
	1 RB high	2552.5	21.15	21.68
		2605	22.24	21.75
		2652.5	21.58	22.71
	50% RB mid	2552.5	20.71	21.35
		2605	22.19	21.90
		2652.5	22.11	22.43
	100% RB	2552.5	22.26	21.51
		2605	22.50	22.34
		2652.5	22.19	22.11
10 MHz	1 RB low	2560	21.00	22.45
		2605	21.22	20.99
		2650	21.86	21.55
	1 RB high	2560	22.56	21.94
		2605	20.63	21.49
		2650	20.95	22.08
	50% RB mid	2560	21.61	21.50
		2605	21.05	21.03
		2650	20.87	21.46
	100% RB	2560	21.80	21.36
		2605	21.04	22.74
		2650	21.89	22.31
15 MHz	1 RB low	2562.5	22.15	21.55
		2605	21.53	21.41
		2647.5	21.65	20.85
	1 RB high	2562.5	21.53	20.71
		2605	22.06	21.79
		2647.5	21.68	21.82
	50% RB mid	2562.5	22.24	21.55
		2605	21.11	22.05
		2647.5	22.06	20.84
	100% RB	2562.5	22.68	22.42
		2605	21.27	21.42
		2647.5	20.98	21.39
20 MHz	1 RB low	2565	21.52	21.21
		2605	22.60	21.56
		2645	22.17	22.06
	1 RB high	2565	21.70	22.18
		2605	21.61	21.20
		2645	21.96	21.41
	50% RB mid	2565	22.46	21.17
		2605	22.07	22.11
		2645	22.27	21.43
	100% RB	2565	21.64	22.27
		2605	22.18	22.18
		2645	22.11	21.73

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.
2. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM 850 Middle Channel								
836.60	H	96.55	21.63	0.00	0.97	20.66	38.45	17.79
836.60	V	102.38	30.59	0.00	0.97	29.62	38.45	8.83
EDGE 850 Middle Channel								
836.60	H	90.24	15.32	0.00	0.97	14.35	33.00	18.65
836.60	V	95.13	23.34	0.00	0.97	22.37	33.00	10.63
WCDMA Band V Middle Channel								
836.60	H	84.56	20.74	0.00	0.97	19.77	38.45	29.78
836.60	V	90.05	18.26	0.00	0.97	17.29	38.45	21.16
GSM 1900 Middle Channel								
1880.00	H	83.74	11.13	11.66	2.66	20.13	33.00	12.87
1880.00	V	90.88	18.41	11.66	2.66	27.41	33.00	5.59
EDGE 1900 Middle Channel								
1880.00	H	79.25	9.64	11.66	2.66	18.64	33.00	14.36
1880.00	V	84.96	12.49	11.66	2.66	21.49	33.00	11.51
WCDMA Band II Middle Channel								
1880.00	H	76.27	3.66	11.66	2.66	12.66	33.00	20.34
1880.00	V	83.15	10.68	11.66	2.66	19.68	33.00	13.32

LTE Band 2

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dB dBi)	Cable Loss (dB)			
1880.000	1.4	QPSK	H	87.62	15.01	11.66	2.66	24.01	33.00	8.99
1880.000			V	86.56	14.09	11.66	2.66	23.09	33.00	9.91
1880.000	3		H	87.61	15.00	11.66	2.66	24.00	33.00	9.00
1880.000			V	86.19	13.72	11.66	2.66	22.72	33.00	10.28
1880.000	5		H	87.15	14.54	11.66	2.66	23.54	33.00	9.46
1880.000			V	86.22	13.75	11.66	2.66	22.75	33.00	10.25
1880.000	10		H	86.88	14.27	11.66	2.66	23.27	33.00	9.73
1880.000			V	86.01	13.54	11.66	2.66	22.54	33.00	10.46
1880.000	15		H	86.36	13.75	11.66	2.66	22.75	33.00	10.25
1880.000			V	85.34	12.87	11.66	2.66	21.87	33.00	11.13
1880.000	20		H	86.25	13.64	11.66	2.66	22.64	33.00	10.36
1880.000			V	85.13	12.66	11.66	2.66	21.66	33.00	11.34
1880.000	1.4	16QAM	H	87.57	14.96	11.66	2.66	23.96	33.00	9.04
1880.000			V	86.40	13.93	11.66	2.66	22.93	33.00	10.07
1880.000	3		H	87.52	14.91	11.66	2.66	23.91	33.00	9.09
1880.000			V	86.28	13.81	11.66	2.66	22.81	33.00	10.19
1880.000	5		H	87.09	14.48	11.66	2.66	23.48	33.00	9.52
1880.000			V	86.10	13.63	11.66	2.66	22.63	33.00	10.37
1880.000	10		H	87.03	14.42	11.66	2.66	23.42	33.00	9.58
1880.000			V	85.70	13.23	11.66	2.66	22.23	33.00	10.77
1880.000	15		H	86.98	14.37	11.66	2.66	23.37	33.00	9.63
1880.000			V	85.71	13.24	11.66	2.66	22.24	33.00	10.76
1880.000	20		H	86.84	14.23	11.66	2.66	23.23	33.00	9.77
1880.000			V	85.66	13.19	11.66	2.66	22.19	33.00	10.81

LTE Band 4

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
1732.500	1.4	QPSK	H	88.80	14.75	10.90	2.51	23.14	30.00	6.86
1732.500			V	86.64	12.27	10.90	2.51	20.66	30.00	9.34
1732.500	3		H	88.63	14.58	10.90	2.51	22.97	30.00	7.03
1732.500			V	86.61	12.24	10.90	2.51	20.63	30.00	9.37
1732.500	5		H	88.71	14.66	10.90	2.51	23.05	30.00	6.95
1732.500			V	86.66	12.29	10.90	2.51	20.68	30.00	9.32
1732.500	10		H	88.76	14.71	10.90	2.51	23.10	30.00	6.90
1732.500			V	86.76	12.39	10.90	2.51	20.78	30.00	9.22
1732.500	15		H	88.68	14.63	10.90	2.51	23.02	30.00	6.98
1732.500			V	86.70	12.33	10.90	2.51	20.72	30.00	9.28
1732.500	20		H	88.51	14.46	10.90	2.51	22.85	30.00	7.15
1732.500			V	86.31	11.94	10.90	2.51	20.33	30.00	9.67
1732.500	1.4	16QAM	H	88.77	14.72	10.90	2.51	23.11	30.00	6.89
1732.500			V	86.53	12.16	10.90	2.51	20.55	30.00	9.45
1732.500	3		H	88.71	14.66	10.90	2.51	23.05	30.00	6.95
1732.500			V	86.65	12.28	10.90	2.51	20.67	30.00	9.33
1732.500	5		H	88.69	14.64	10.90	2.51	23.03	30.00	6.97
1732.500			V	86.47	12.10	10.90	2.51	20.49	30.00	9.51
1732.500	10		H	88.74	14.69	10.90	2.51	23.08	30.00	6.92
1732.500			V	86.52	12.15	10.90	2.51	20.54	30.00	9.46
1732.500	15		H	88.49	14.44	10.90	2.51	22.83	30.00	7.17
1732.500			V	86.30	11.93	10.90	2.51	20.32	30.00	9.68
1732.500	20		H	88.17	14.12	10.90	2.51	22.51	30.00	7.49
1732.500			V	85.97	11.60	10.90	2.51	19.99	30.00	10.01

LTE Band 5

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
836.50	1.4	QPSK	H	80.72	19.75	0.00	0.97	18.78	38.45	33.63
836.50			V	92.13	20.34	0.00	0.97	19.37	38.45	19.08
836.50	3		H	83.59	18.66	0.00	0.97	17.69	38.45	30.76
836.50			V	91.95	20.16	0.00	0.97	19.19	38.45	19.26
836.50	5		H	84.20	19.27	0.00	0.97	18.30	38.45	30.15
836.50			V	94.03	22.24	0.00	0.97	21.27	38.45	17.18
836.50	10		H	82.60	17.67	0.00	0.97	16.70	38.45	31.75
836.50			V	90.89	19.10	0.00	0.97	18.13	38.45	20.32
836.50	1.4	16QAM	H	80.88	15.95	0.00	0.97	14.98	38.45	33.47
836.50			V	92.44	20.65	0.00	0.97	19.68	38.45	18.77
836.50	3		H	83.19	18.26	0.00	0.97	17.29	38.45	31.16
836.50			V	92.11	20.32	0.00	0.97	19.35	38.45	19.10
836.50	5		H	84.44	19.51	0.00	0.97	18.54	38.45	29.91
836.50			V	94.16	22.37	0.00	0.97	21.40	38.45	17.05
836.50	10		H	82.91	17.98	0.00	0.97	17.01	38.45	31.44
836.50			V	92.10	20.31	0.00	0.97	19.34	38.45	19.11

LTE Band 7

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
2535.00	5	QPSK	H	87.81	15.20	13.14	3.10	25.24	33.00	7.76
2535.00			V	80.48	9.33	13.14	3.10	19.37	33.00	13.63
2535.00	10		H	87.43	14.82	13.14	3.10	24.86	33.00	8.14
2535.00			V	80.87	9.72	13.14	3.10	19.76	33.00	13.24
2535.00	15		H	87.40	14.79	13.14	3.10	24.83	33.00	8.17
2535.00			V	80.73	9.58	13.14	3.10	19.62	33.00	13.38
2535.00	20		H	86.47	13.86	13.14	3.10	23.90	33.00	9.10
2535.00			V	79.72	8.57	13.14	3.10	18.61	33.00	14.39
2535.00	5	16QAM	H	87.42	14.81	13.14	3.10	24.85	33.00	8.15
2535.00			V	80.11	8.96	13.14	3.10	19.00	33.00	14.00
2535.00	10		H	87.09	14.48	13.14	3.10	24.52	33.00	8.48
2535.00			V	79.77	8.62	13.14	3.10	18.66	33.00	14.34
2535.00	15		H	86.89	14.28	13.14	3.10	24.32	33.00	8.68
2535.00			V	79.63	8.48	13.14	3.10	18.52	33.00	14.48
2535.00	20		H	86.30	13.69	13.14	3.10	23.73	33.00	9.27
2535.00			V	79.21	8.06	13.14	3.10	18.10	33.00	14.90

LTE Band 12

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)				
707.50	1.4	QPSK	H	81.26	14.40	0.00	0.94	13.46	34.77	31.31	
707.50			V	91.16	16.74	0.00	0.94	15.80	34.77	18.97	
707.50	3		H	81.07	14.21	0.00	0.94	13.27	34.77	31.50	
707.50			V	91.15	16.73	0.00	0.94	15.79	34.77	18.98	
707.50	5		H	81.13	14.27	0.00	0.94	13.33	34.77	31.44	
707.50			V	91.08	16.66	0.00	0.94	15.72	34.77	19.05	
707.50	10		H	81.01	14.15	0.00	0.94	13.21	34.77	31.56	
707.50			V	91.00	16.58	0.00	0.94	15.64	34.77	19.13	
707.50	1.4		16QAM	H	81.44	14.58	0.00	0.94	13.64	34.77	31.13
707.50				V	91.24	16.82	0.00	0.94	15.88	34.77	18.89
707.50	3	H		81.40	14.54	0.00	0.94	13.60	34.77	31.17	
707.50		V		91.36	16.94	0.00	0.94	16.00	34.77	18.77	
707.50	5	H		81.20	14.34	0.00	0.94	13.40	34.77	31.37	
707.50		V		91.18	16.76	0.00	0.94	15.82	34.77	18.95	
707.50	10	H		81.03	14.17	0.00	0.94	13.23	34.77	31.54	
707.50		V		91.01	16.59	0.00	0.94	15.65	34.77	19.12	

LTE Band 17

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
710.00	5	QPSK	H	82.83	16.02	0.00	0.94	15.08	34.77	29.69
710.00			V	92.48	18.12	0.00	0.94	17.18	34.77	17.59
710.00	10		H	78.98	17.17	0.00	0.94	16.23	34.77	33.54
710.00			V	90.18	15.82	0.00	0.94	14.88	34.77	19.89
710.00	5	16QAM	H	83.01	16.20	0.00	0.94	15.26	34.77	29.51
710.00			V	92.50	18.14	0.00	0.94	17.20	34.77	17.57
710.00	10		H	79.38	14.57	0.00	0.94	13.63	34.77	33.14
710.00			V	90.55	16.19	0.00	0.94	15.25	34.77	19.52

LTE Band 26

					Substituted Method			
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Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)	Absolute Level (d Bm)	Limit (dBm)	Margin (dB)
819.00	1.4	QPSK	H	81.45	15.40	0.00	0.97	14.43	38.45	31.78
819.00			V	92.05	20.13	0.00	0.97	19.16	38.45	18.75
819.00	3		H	81.74	18.28	0.00	0.97	17.31	38.45	30.92
819.00			V	92.63	17.03	0.00	0.97	16.06	38.45	18.78
819.00	5		H	80.22	17.54	0.00	0.97	16.57	38.45	33.18
819.00			V	91.45	15.91	0.00	0.97	14.94	38.45	19.45
819.00	10		H	83.56	16.84	0.00	0.97	15.87	38.45	33.64
819.00			V	92.07	19.73	0.00	0.97	18.76	38.45	19.63
819.00	1.4	16QAM	H	82.49	16.54	0.00	0.97	15.57	38.45	31.48
819.00			V	90.76	17.77	0.00	0.97	16.80	38.45	18.04
819.00	3		H	81.56	15.52	0.00	0.97	14.55	38.45	30.88
819.00			V	92.75	18.62	0.00	0.97	17.65	38.45	18.77
819.00	5		H	82.67	15.92	0.00	0.97	14.95	38.45	32.84
819.00			V	91.57	17.74	0.00	0.97	16.77	38.45	18.96
819.00	10		H	81.09	17.44	0.00	0.97	16.47	38.45	33.30
819.00			V	90.25	16.82	0.00	0.97	15.85	38.45	19.39

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
831.50	1.4	QPSK	H	82.60	17.64	0.00	0.97	16.67	38.45	31.78
831.50			V	92.52	20.67	0.00	0.97	19.70	38.45	18.75
831.50	3		H	83.46	18.50	0.00	0.97	17.53	38.45	30.92
831.50			V	92.49	20.64	0.00	0.97	19.67	38.45	18.78
831.50	5		H	81.20	16.24	0.00	0.97	15.27	38.45	33.18
831.50			V	91.82	19.97	0.00	0.97	19.00	38.45	19.45
831.50	10		H	80.74	15.78	0.00	0.97	14.81	38.45	33.64
831.50			V	91.64	19.79	0.00	0.97	18.82	38.45	19.63
831.50	15		H	78.24	13.28	0.00	0.97	12.31	38.45	36.14
831.50			V	90.07	18.22	0.00	0.97	17.25	38.45	21.20
831.50	1.4	16QAM	H	82.90	17.94	0.00	0.97	16.97	38.45	31.48
831.50			V	93.23	21.38	0.00	0.97	20.41	38.45	18.04
831.50	3		H	83.50	18.54	0.00	0.97	17.57	38.45	30.88
831.50			V	92.50	20.65	0.00	0.97	19.68	38.45	18.77
831.50	5		H	81.54	16.58	0.00	0.97	15.61	38.45	32.84
831.50			V	92.31	20.46	0.00	0.97	19.49	38.45	18.96
831.50	10		H	81.08	16.12	0.00	0.97	15.15	38.45	33.30
831.50			V	91.88	20.03	0.00	0.97	19.06	38.45	19.39
831.50	15		H	78.34	13.38	0.00	0.97	12.41	38.45	36.04
831.50			V	90.11	18.26	0.00	0.97	17.29	38.45	21.16

LTE Band 38

					Substituted Method			
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Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Level (dBm)	Antenna Gain (dBd/dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2595.00	5	QPSK	H	87.38	15.15	13.20	3.10	25.25	33.00	7.75
2595.00			V	81.40	11.03	13.20	3.10	21.13	33.00	11.87
2595.00	10		H	87.09	14.86	13.20	3.10	24.96	33.00	8.04
2595.00			V	81.27	10.90	13.20	3.10	21.00	33.00	12.00
2595.00	15		H	86.85	14.62	13.20	3.10	24.72	33.00	8.28
2595.00			V	81.15	10.78	13.20	3.10	20.88	33.00	12.12
2595.00	20		H	86.54	14.31	13.20	3.10	24.41	33.00	8.59
2595.00			V	81.05	10.68	13.20	3.10	20.78	33.00	12.22
2595.00	5	16QAM	H	87.10	14.87	13.20	3.10	24.97	33.00	8.03
2595.00			V	81.22	10.85	13.20	3.10	20.95	33.00	12.05
2595.00	10		H	87.02	14.79	13.20	3.10	24.89	33.00	8.11
2595.00			V	81.32	10.95	13.20	3.10	21.05	33.00	11.95
2595.00	15		H	86.98	14.75	13.20	3.10	24.85	33.00	8.15
2595.00			V	81.10	10.73	13.20	3.10	20.83	33.00	12.17
2595.00	20		H	86.49	14.26	13.20	3.10	24.36	33.00	8.64
2595.00			V	81.02	10.65	13.20	3.10	20.75	33.00	12.25

LTE Band 41

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (dBm)	Margin (d B)
					Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
2595.00	5	QPSK	H	88.37	16.14	13.20	3.10	26.24	33.00	6.76
2595.00			V	83.88	13.51	13.20	3.10	23.61	33.00	9.39
2595.00	10		H	88.26	16.03	13.20	3.10	26.13	33.00	6.87
2595.00			V	83.74	13.37	13.20	3.10	23.47	33.00	9.53
2595.00	15		H	87.29	15.06	13.20	3.10	25.16	33.00	7.84
2595.00			V	83.41	13.04	13.20	3.10	23.14	33.00	9.86
2595.00	20		H	87.19	14.96	13.20	3.10	25.06	33.00	7.94
2595.00			V	83.13	12.76	13.20	3.10	22.86	33.00	10.14
2595.00	5	16QAM	H	88.23	16.00	13.20	3.10	26.10	33.00	6.90
2595.00			V	83.85	13.48	13.20	3.10	23.58	33.00	9.42
2595.00	10		H	87.98	15.75	13.20	3.10	25.85	33.00	7.15
2595.00			V	83.55	13.18	13.20	3.10	23.28	33.00	9.72
2595.00	15		H	87.79	15.56	13.20	3.10	25.66	33.00	7.34
2595.00			V	83.58	13.21	13.20	3.10	23.31	33.00	9.69
2595.00	20		H	87.65	15.42	13.20	3.10	25.52	33.00	7.48
2595.00			V	83.26	12.89	13.20	3.10	22.99	33.00	10.01

Note:

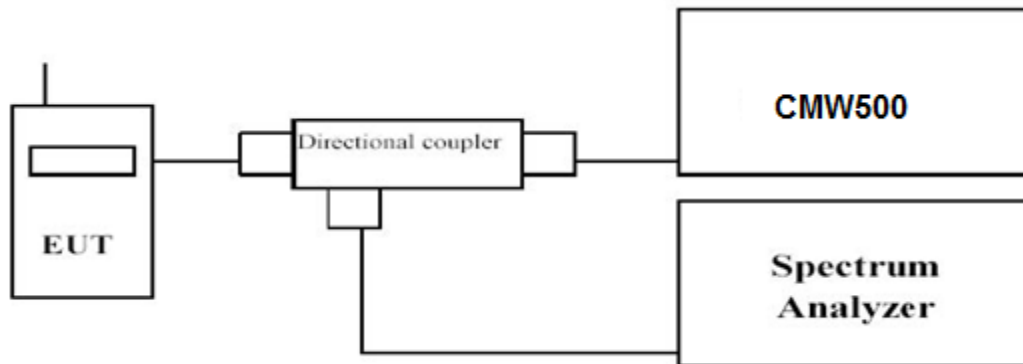
- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

3.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
 - 1). for continuous transmissions, set to 1 ms,
 - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

1. For E-UTRA Band 2, please refer to Appendix Band 2: Section A;
2. For E-UTRA Band 4, please refer to Appendix Band 4: Section A;
3. For E-UTRA Band 5, please refer to Appendix Band 5: Section A;
4. For E-UTRA Band 7, please refer to Appendix Band 7: Section A;
5. For E-UTRA Band 12, please refer to Appendix Band 12: Section A;
6. For E-UTRA Band 17, please refer to Appendix Band 17: Section A;
7. For E-UTRA Band 26(824MHz~849MHz), please refer to Appendix Band 26(824MHz~849MHz): Section A;
8. For E-UTRA Band 26(814MHz~824MHz), please refer to Appendix Band 26(814MHz~824MHz): Section A;
9. For E-UTRA Band 38, please refer to Appendix Band 38: Section A;
10. For E-UTRA Band 41, please refer to Appendix Band 41: Section A;

Test Mode	Channel	Frequency (MHz)	PAPR Value (dB)	Limits (dB)	Verdict
GSM/TM1/GSM1900	661	1880.00	0.65	13.0	PASS
GSM/TM3/EDGE1900	661	1880.00	3.59	13.0	PASS
GSM/TM1/GSM850	190	836.6	0.83	13.0	PASS
GSM/TM3/EDGE850	190	836.6	3.74	13.0	PASS

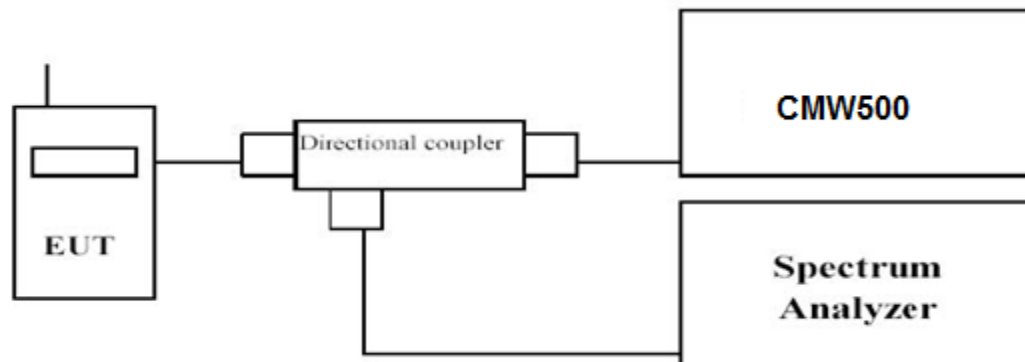
Test Mode	Channel	Frequency (MHz)	PAPR Value (dB)	Limits (dB)	Verdict
UMTS/TM1/ WCDMA Band II	9400	1880.00	3.48	13.0	PASS
UMTS/TM1/ WCDMA Band V	4182	836.40	3.29	13.0	PASS

3.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

FCC §2.1049, §22.917, §22.905, §24.238, §27.53 and §90.209

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBW was set to about 1% of emission BW, VBW $\geq$ 3 times RBW. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

1. For E-UTRA Band 2, please refer to Appendix Band 2: Section B;
2. For E-UTRA Band 4, please refer to Appendix Band 4: Section B;
3. For E-UTRA Band 5, please refer to Appendix Band 5: Section B;
4. For E-UTRA Band 7, please refer to Appendix Band 7: Section B;
5. For E-UTRA Band 12, please refer to Appendix Band 12: Section B;
6. For E-UTRA Band 17, please refer to Appendix Band 17: Section B.
7. For E-UTRA Band 26(824MHz~849MHz), please refer to Appendix Band 26(824MHz~849MHz): Section B;
8. For E-UTRA Band 26(814MHz~824MHz), please refer to Appendix Band 26(814MHz~824MHz): Section B;
9. For E-UTRA Band 38, please refer to Appendix Band 38: Section B;
10. For E-UTRA Band 41, please refer to Appendix Band 41: Section B;

Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (KHz)	Emission Bandwidth (-26 dBc BW) (KHz)	Verdict
GSM/TM3 /GSM850	190	836.6	246.02	316.9	PASS
GSM/TM3 /EDGE850	190	836.6	240.24	314.0	PASS
GSM/TM1 /GSM1900	661	1880.0	243.12	314.0	PASS
GSM/TM3 /EDGE1900	661	1880.0	238.79	314.0	PASS

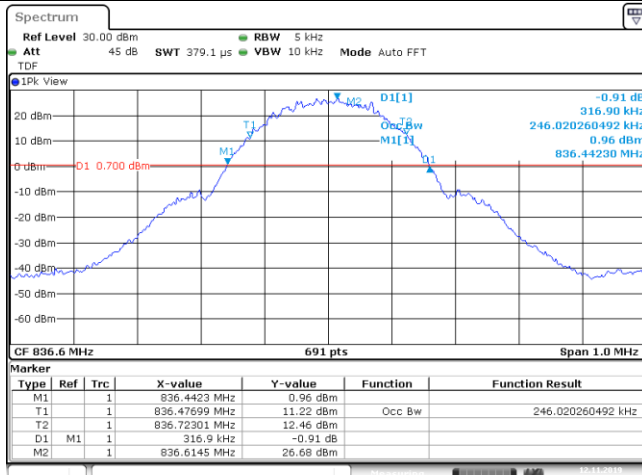
Test Mode	Channel	Frequency (MHz)	Occupied Bandwidth (99% BW) (MHz)	Emission Bandwidth (-26 dBc BW) (MHz)	Verdict
UMTS/TM1/ WCDMA Band II	9400	1880.00	4.1968	4.732	PASS
UMTS/TM1/ WCDMA Band V	4182	836.40	4.173	4.686	PASS

Remark:

1. Test results including cable loss;
2. Please refer to following plots;

Occupied Bandwidth and Emission Bandwidth

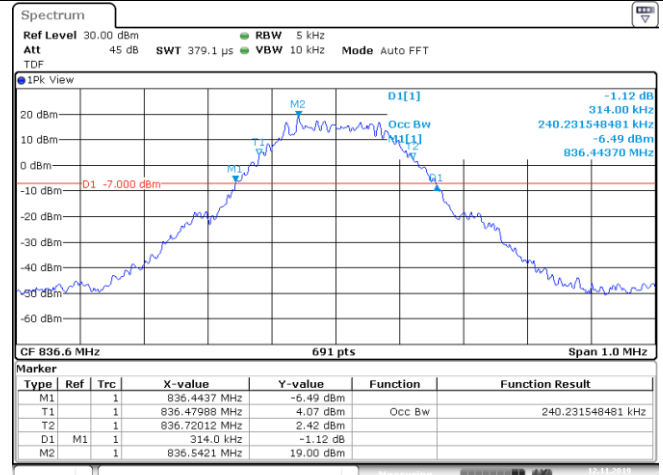
GSM/TM1/GSM850



Date: 12.NOV.2019 18:36:11

Channel 190 / 836.6 MHz

GSM/TM3/EDGE850

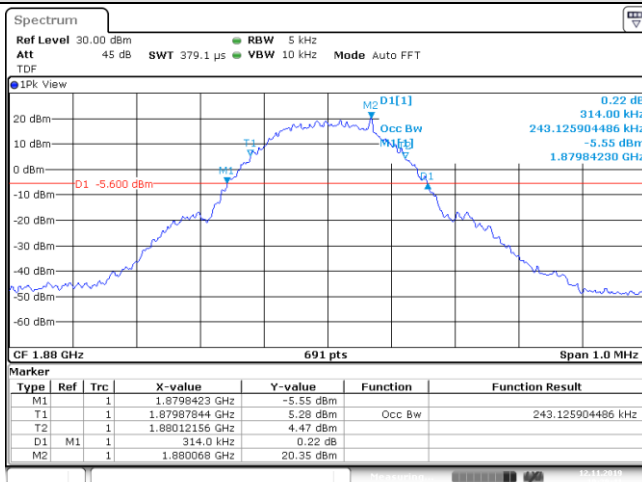


Date: 12.NOV.2019 18:59:53

Channel 190 / 836.6 MHz

Occupied Bandwidth and Emission Bandwidth

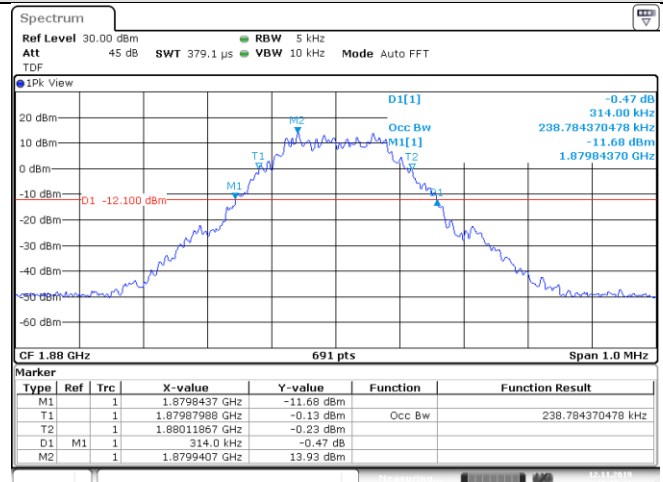
GSM/TM1/GSM1900



Date: 12.NOV.2019 19:29:41

Channel 661 / 1880.0MHz

GSM/TM3/ EDGE1900

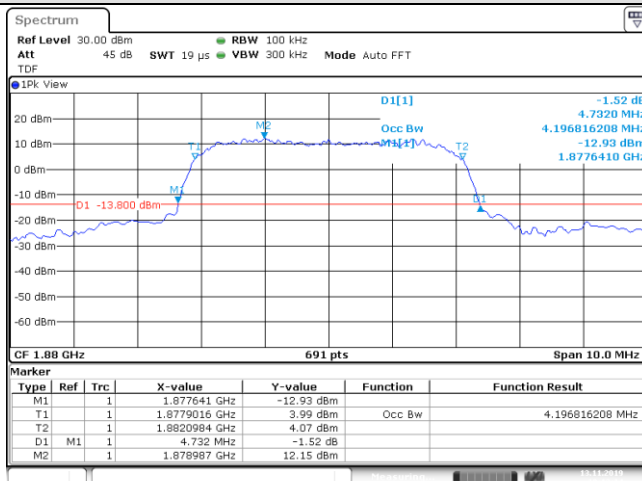


Date: 12.NOV.2019 19:35:41

Channel 661 / 1880.0MHz

Occupied Bandwidth and Emission Bandwidth

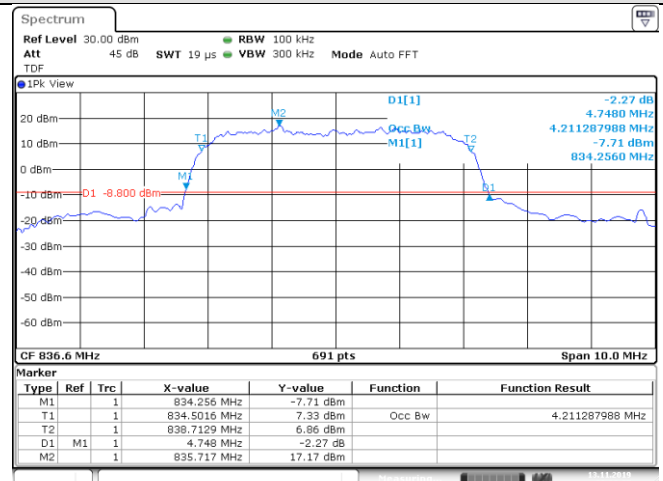
UMTS/TM1/ WCDMA Band II



Date: 13.NOV.2019 10:12:13

Channel 9400 / 1880.0 MHz

UMTS/TM1/ WCDMA Band V



Date: 13.NOV.2019 09:28:35

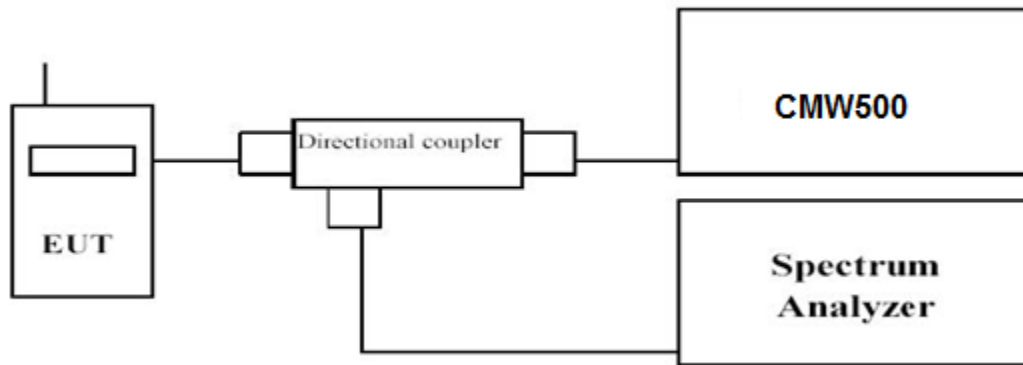
Channel 4182 / 836.4 MHz

3.4 Band Edge compliance

LIMIT

FCC § 2.1053, §22.917, § 24.238 and § 27.53& §90.691.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

1. For E-UTRA Band 2, please refer to Appendix Band 2: Section C;
2. For E-UTRA Band 4, please refer to Appendix Band 4: Section C;
3. For E-UTRA Band 5, please refer to Appendix Band 5: Section C;
4. For E-UTRA Band 7, please refer to Appendix Band 7: Section C;
5. For E-UTRA Band 12, please refer to Appendix Band 12: Section C;
6. For E-UTRA Band 17, please refer to Appendix Band 17: Section C;
7. For E-UTRA Band 26(824MHz~849MHz), please refer to Appendix Band 26(824MHz~849MHz): Section C;
8. For E-UTRA Band 26(814MHz~824MHz), please refer to Appendix Band 26(814MHz~824MHz): Section C;
9. For E-UTRA Band 38, please refer to Appendix Band 38: Section C;
10. For E-UTRA Band 41, please refer to Appendix Band 41: Section C;

Test Mode	Channel	Frequency (MHz)	Band Edg Compliance (dBm)	Limits (dBm)	Verdict
GSM/TM1/GSM850	128	824.2	<-13dBm	-13dBm	PASS
	251	848.8	<-13dBm	-13dBm	
GSM/TM3/EDGE850	128	824.2	<-13dBm	-13dBm	PASS
	251	848.8	<-13dBm	-13dBm	
GSM/TM1/GSM1900	512	1850.2	<-13dBm	-13dBm	PASS
	810	1909.8	<-13dBm	-13dBm	
GSM/TM3/EDGE1900	512	1850.2	<-13dBm	-13dBm	PASS
	810	1909.8	<-13dBm	-13dBm	

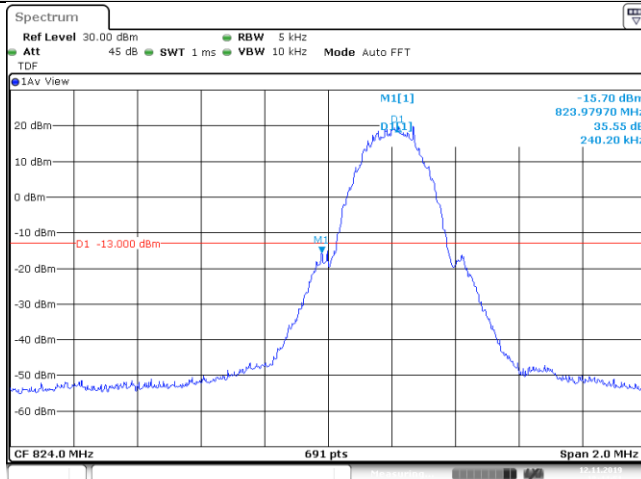
UMTS/TM1/WCDMA Band II					
Test Mode	Channel	Frequency (MHz)	Band Edg Compliance (dBm)	Limits (dBm)	Verdict
UMTS/TM1/WCDMA Band II	9262	1852.40	<-13dBm	-13dBm	PASS
	9538	1907.60	<-13dBm	-13dBm	
UMTS/TM1/WCDMA Band V					
Test Mode	Channel	Frequency (MHz)	Band Edg Compliance (dBm)	Limits (dBm)	Verdict
UMTS/TM1/WCDMA Band V	4132	826.40	<-13dBm	-13dBm	PASS
	4233	846.60	<-13dBm	-13dBm	

Remark:

1. Test results including cable loss;
2. Please refer to following plots;

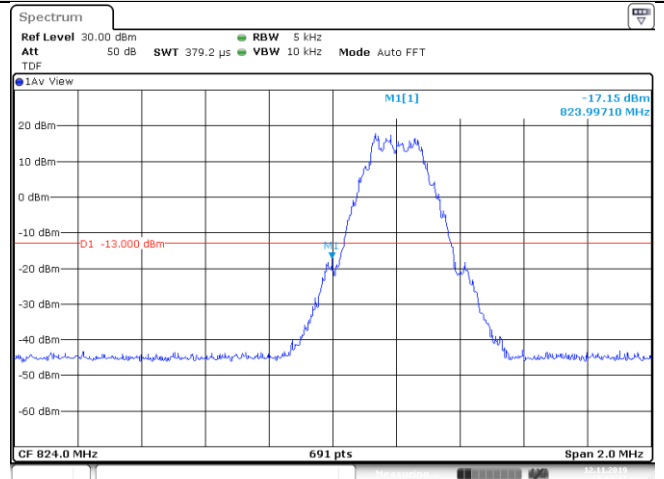
Band-edge Compliance

GSM/TM1/GSM850



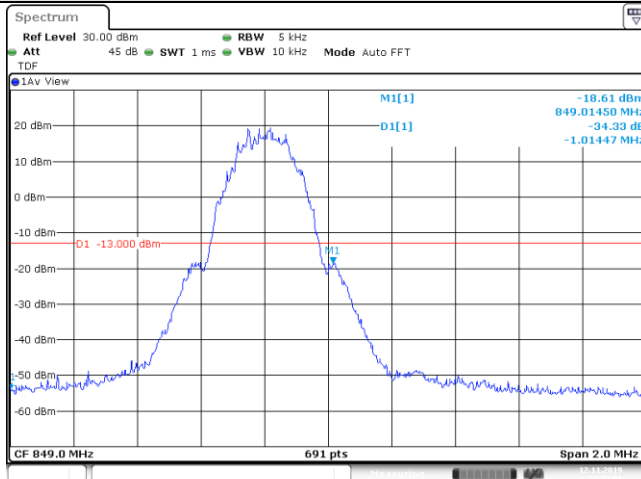
Date: 12.NOV.2019 18:44:51

GSM/TM3/EDGE850



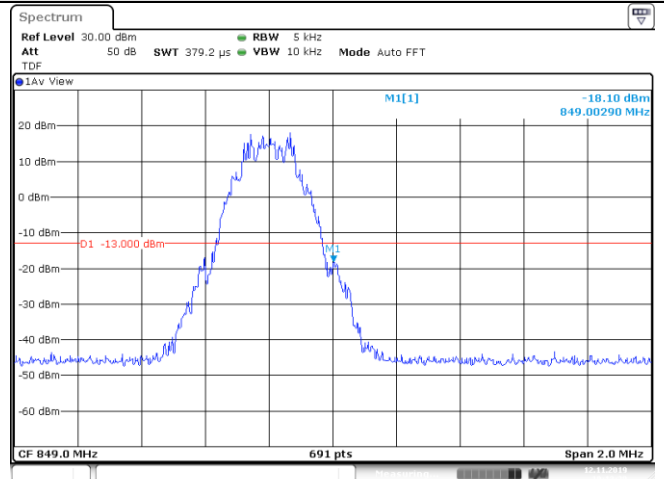
Date: 12.NOV.2019 19:12:31

Channel 128 / 824.2 MHz



Date: 12.NOV.2019 18:46:01

Channel 128 / 824.2 MHz



Date: 12.NOV.2019 19:13:29

Channel 251 / 848.8 MHz

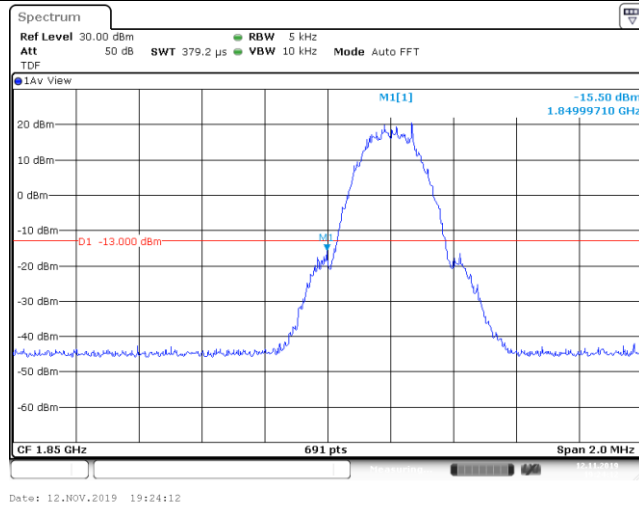
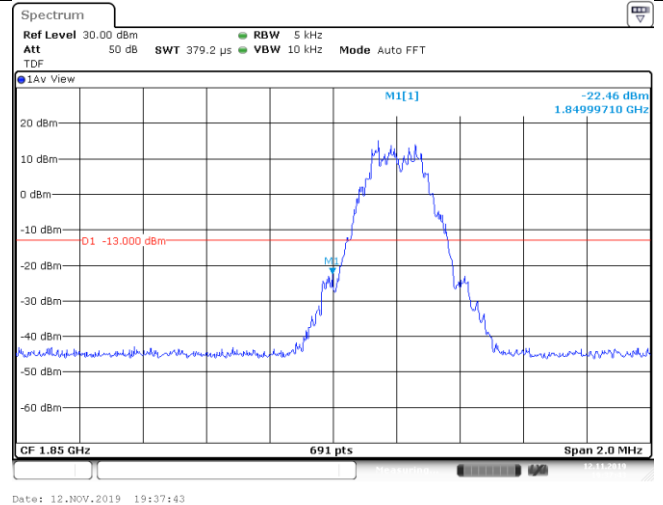
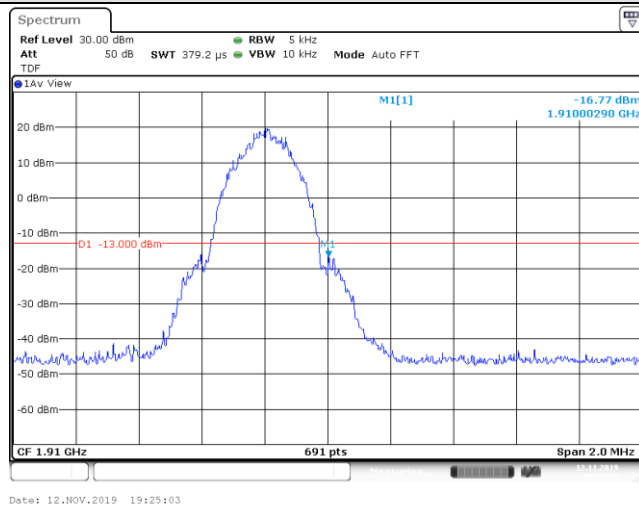
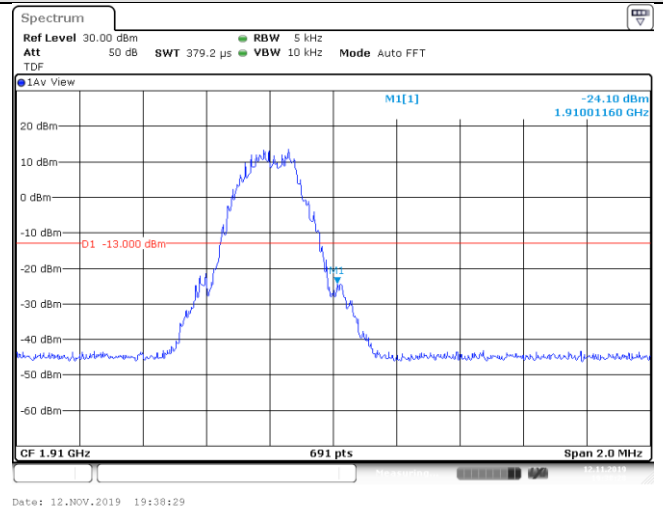


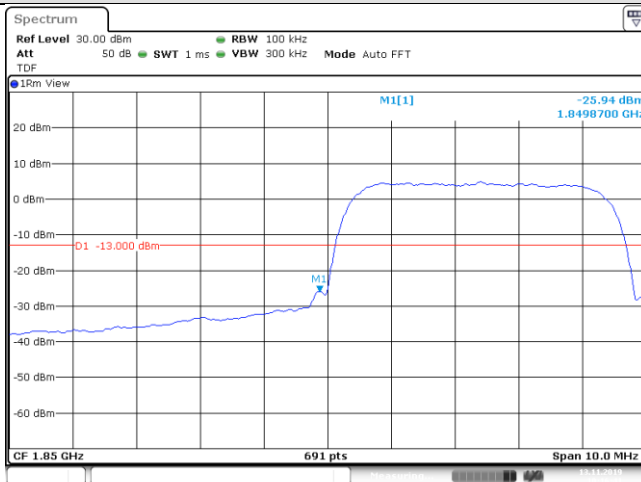
Date: 12.NOV.2019 18:46:01

Channel 251 / 848.8 MHz

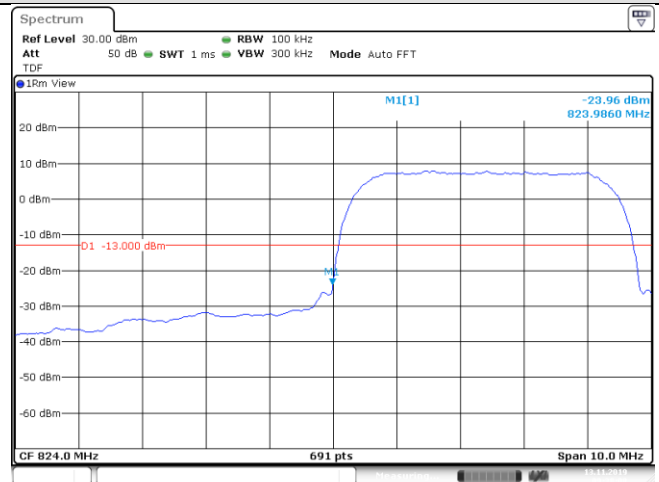


Date: 12.NOV.2019 19:13:29

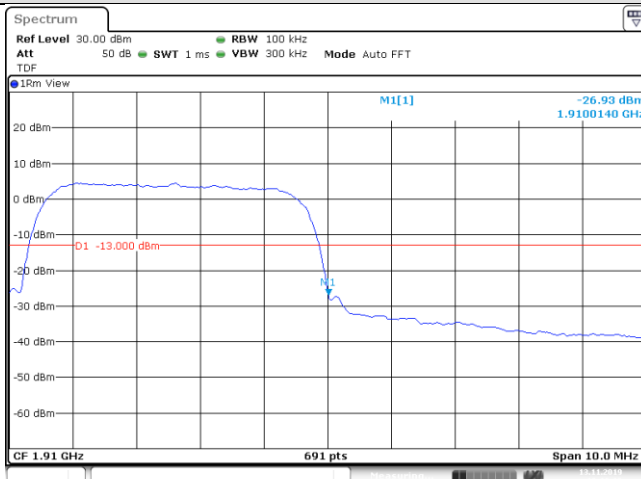
Band-edge Compliance**GSM/TM1/GSM1900****GSM/TM3/EDGE1900****Channel 512 / 1850.2 MHz****Channel 512 / 1850.2 MHz****Channel 810 / 1909.8 MHz****Channel 810 / 1909.8 MHz**

Band-edge Compliance**UMTS/TM1/WCDMA Band II**

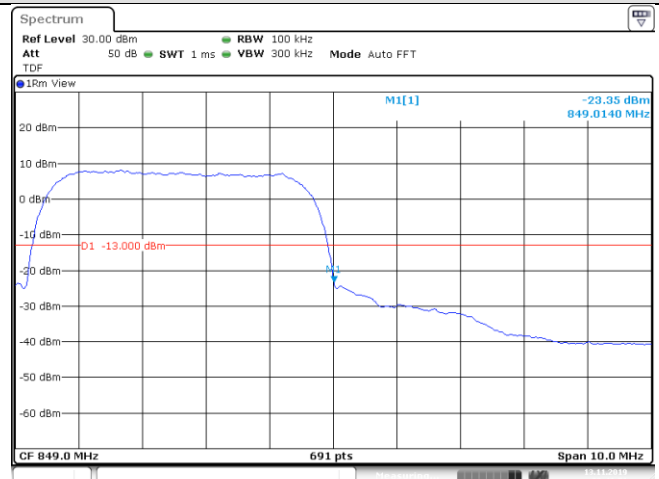
Date: 13.NOV.2019 10:16:40

UMTS/TM1/WCDMA Band V

Date: 13.NOV.2019 09:38:08

Channel 9262 / 1852.4 MHz

Date: 13.NOV.2019 10:19:16

Channel 4132 / 826.4 MHz

Date: 13.NOV.2019 09:41:51

Channel 9538 / 1907.6 MHz**Channel 4233 / 846.6 MHz**

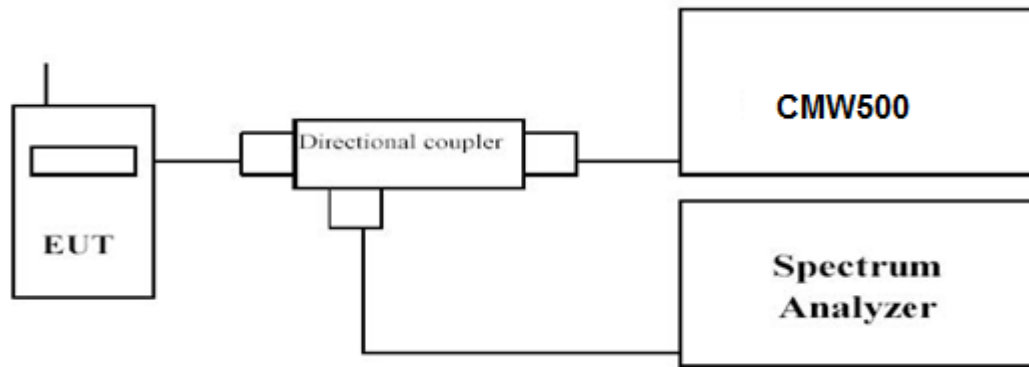
3.5 Spurious Emission

LIMIT

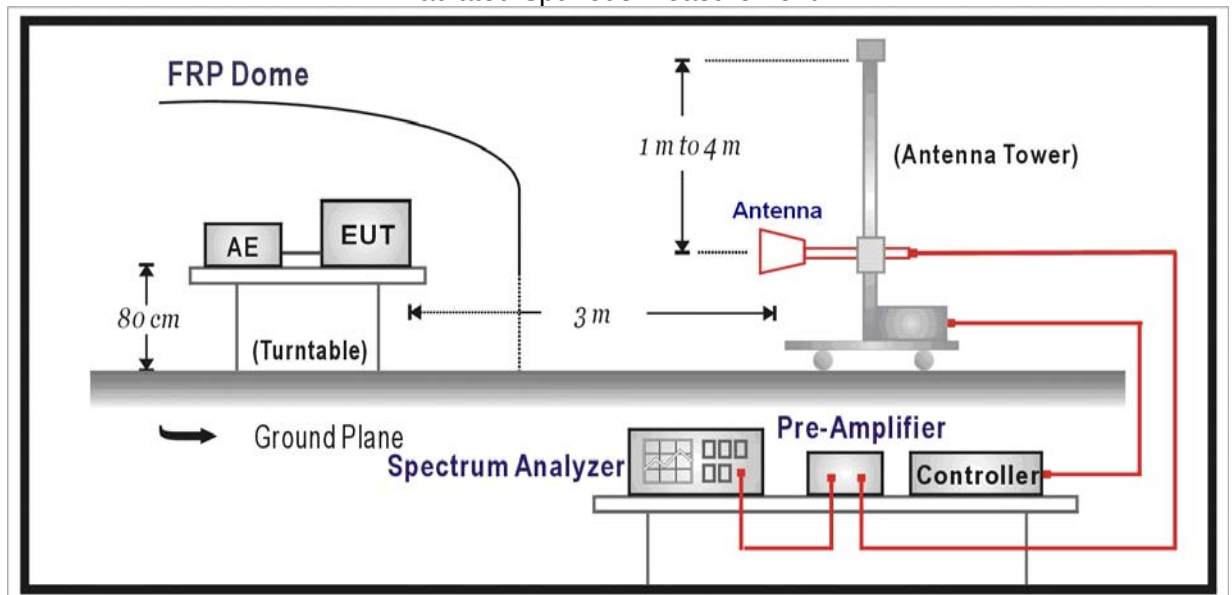
FCC § 2.1053, §22.917, § 24.238 and § 27.53&§90.691.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.
- Please refer to following tables for test antenna conducted emissions.

Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBm)	Limits (dBm)	Verdict
GSM/TM1/GSM850	190	836.6	<-13dBm	-13dBm	PASS
GSM/TM3/EDGE850	190	836.6	<-13dBm	-13dBm	PASS
GSM/TM1/GSM1900	661	1880.0	<-13dBm	-13dBm	PASS
GSM/TM3/EDGE1900	661	1880.0	<-13dBm	-13dBm	PASS

Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBm)	Limits (dBm)	Verdict
UMTS/TM1/WCDMA Band II	9400	1880.00	<-13dBm	-13dBm	PASS
UMTS/TM1/WCDMA Band V	4182	836.40	<-13dBm	-13dBm	PASS

Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 2	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 4	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 5	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 7	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 12	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 17	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 26	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 38	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto
LTE FDD Band 41	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26	1 MHz	3 MHz	Auto

Remark:

1. Test results including cable loss;
2. Please refer to following plots;
3. Not reorded test plots from 9 KHz to 30 MHz as emission levels 20dB lower than emission limit;

Radiated Spurious Measurement:

- a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c. The output of the test antenna shall be connected to the measuring receiver.
- d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h. The maximum signal level detected by the measuring receiver shall be noted.
- i. The transmitter shall be replaced by a substitution antenna.
- j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k. The substitution antenna shall be connected to a calibrated signal generator.
- l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
- r. Test site anechoic chamber refer to ANSI C63.

TEST RESULTS**Conducted Measurement:***Remark:*

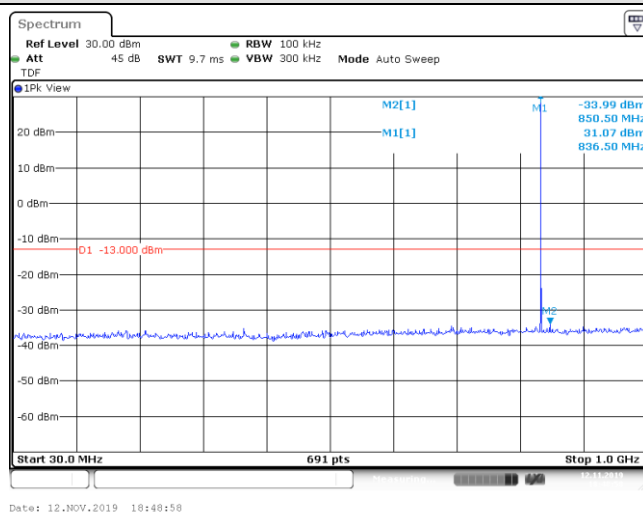
We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

1. For E-UTRA Band 2, please refer to Appendix Band 2: Section D;
2. For E-UTRA Band 4, please refer to Appendix Band 4: Section D;
3. For E-UTRA Band 5, please refer to Appendix Band 5: Section D;
4. For E-UTRA Band 7, please refer to Appendix Band 7: Section D;
5. For E-UTRA Band 12, please refer to Appendix Band 12: Section D;
6. For E-UTRA Band 17, please refer to Appendix Band 17: Section D;
7. For E-UTRA Band 26(824MHz~849MHz), please refer to Appendix Band 26(824MHz~849MHz): Section D;
8. For E-UTRA Band 26(814MHz~824MHz), please refer to Appendix Band 26(814MHz~824MHz): Section D;
9. For E-UTRA Band 38, please refer to Appendix Band 38: Section D;
10. For E-UTRA Band 41, please refer to Appendix Band 41: Section D;

Spurious Emission on Antenna Port

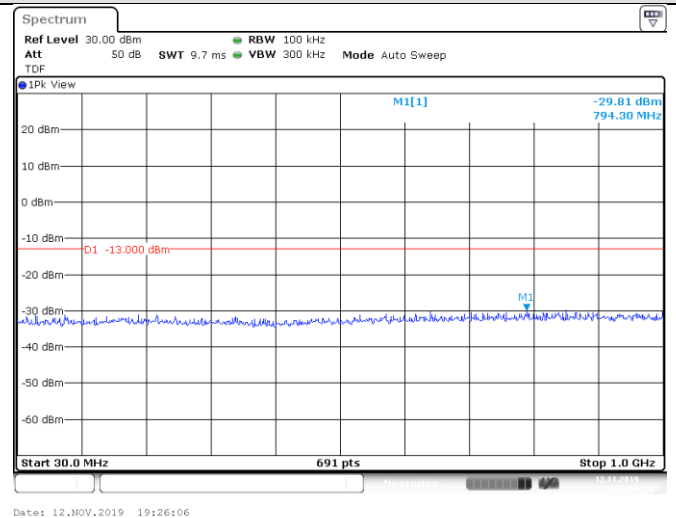
GSM/TM1/GSM850

Channel 190 / 836.6 MHz

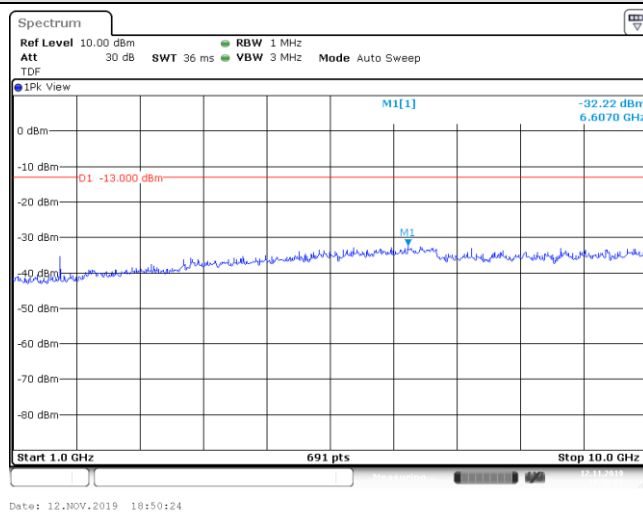


GSM/TM1/GSM1900

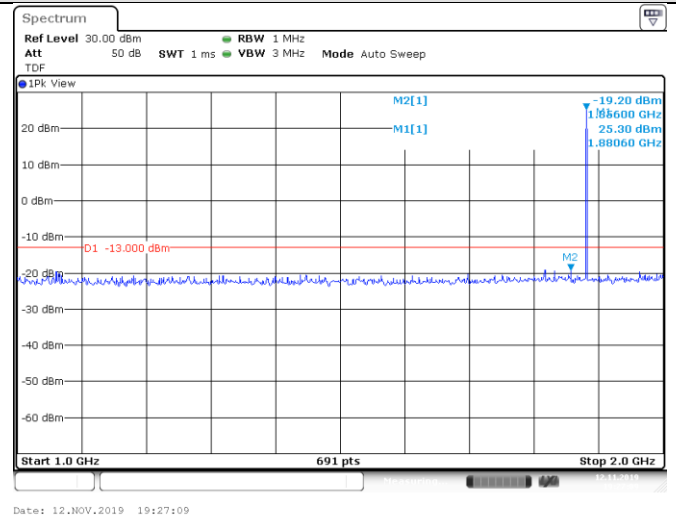
Channel 661 / 1880.0 MHz



30 MHz – 1000 MHz



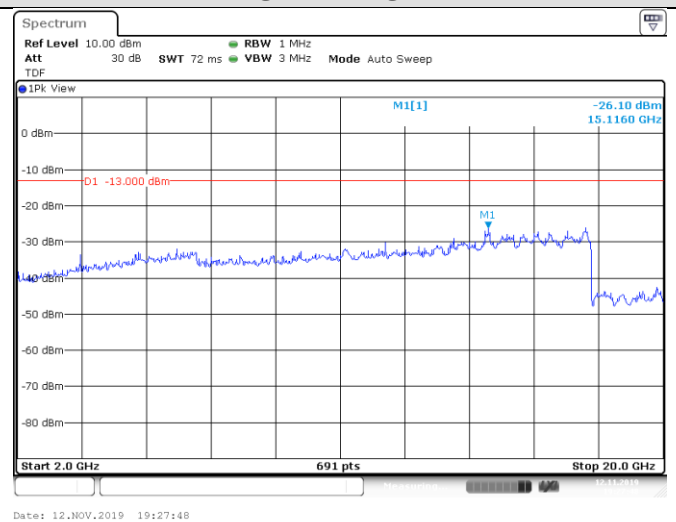
30 MHz – 1000 MHz



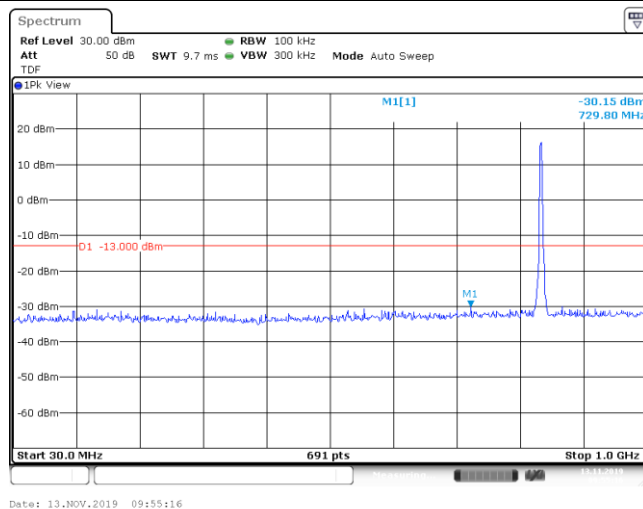
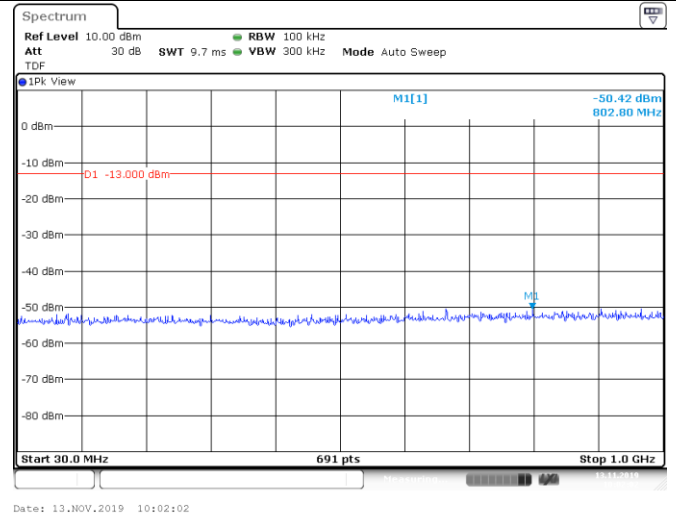
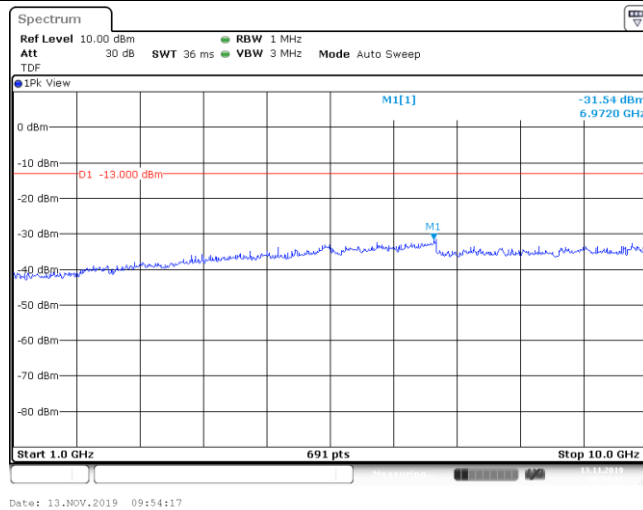
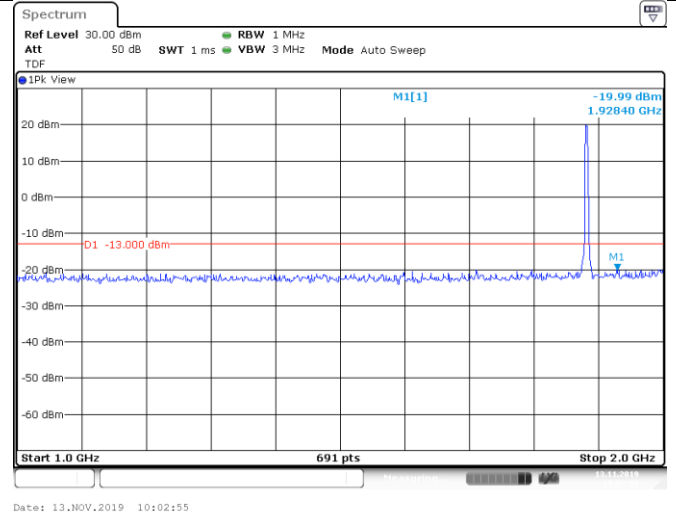
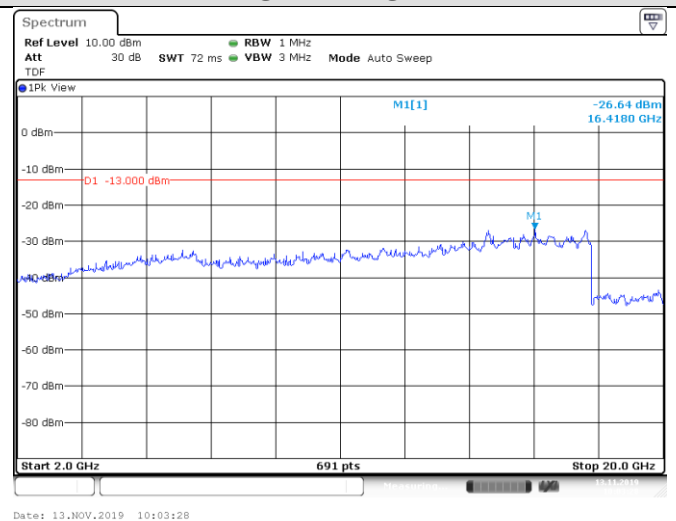
1 GHz – 10 GHz



1 GHz – 2 GHz



2 GHz – 20 GHz

Spurious Emission on Antenna Port**UMTS/TM1/WCDMA Band V**
Channel 4233 / 846.6 MHz**UMTS/TM1/WCDMA Band II**
Channel 9400 / 1880 MHz**30 MHz – 1000 MHz****30 MHz – 1000 MHz****1 GHz – 10 GHz****1 GHz – 2 GHz****2 GHz – 20 GHz**

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	45.38	-68.83	10.6	0.73	-59.0	-13.0	46.0
1673.200	V	45.96	-68.85	10.6	0.73	-59.0	-13.0	46.0
2509.800	H	45.87	-67.15	13.1	1.25	-55.3	-13.0	42.3
2509.800	V	46.55	-66.5	13.1	1.25	-54.6	-13.0	41.6
3346.400	H	45.72	-64.94	13.8	1.61	-52.7	-13.0	39.7
3346.400	V	46.87	-63.84	13.8	1.61	-51.6	-13.0	38.6
314.000	H	46.32	-61.78	0.0	0.53	-62.3	-13.0	49.3
314.000	V	47.55	-62.18	0.0	0.53	-62.7	-13.0	49.7
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	44.66	-69.55	10.6	0.73	-59.7	-13.0	46.7
1673.200	V	43.51	-71.3	10.6	0.73	-61.4	-13.0	48.4
2509.800	H	45.43	-67.59	13.1	1.25	-55.7	-13.0	42.7
2509.800	V	45.85	-67.2	13.1	1.25	-55.3	-13.0	42.3
3346.400	H	45.42	-65.24	13.8	1.61	-53.0	-13.0	40.0
3346.400	V	46.41	-64.3	13.8	1.61	-52.1	-13.0	39.1
328.000	H	47.58	-59.99	0.0	0.55	-60.5	-13.0	47.5
328.000	V	49.95	-59.52	0.0	0.55	-60.1	-13.0	47.1

30MHz-20GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	47.73	-61.07	13.8	1.63	-48.9	-13.0	35.9
3760.000	V	47.84	-60.83	13.8	1.63	-48.7	-13.0	35.7
5640.000	H	47.09	-58.94	14.0	1.31	-46.2	-13.0	33.2
5640.000	V	47.82	-58.09	14.0	1.31	-45.4	-13.0	32.4
267.000	H	43.69	-65.35	0.0	0.51	-65.9	-13.0	52.9
267.000	V	46.88	-64.87	0.0	0.51	-65.4	-13.0	52.4
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	46.99	-61.81	13.8	1.63	-49.7	-13.0	36.7
3760.000	V	46.62	-62.05	13.8	1.63	-49.9	-13.0	36.9
5640.000	H	54.07	-51.96	14.0	1.31	-39.3	-13.0	26.3
5640.000	V	56.31	-49.6	14.0	1.31	-36.9	-13.0	23.9
348.000	H	46.87	-59.93	0.0	0.56	-60.5	-13.0	47.5
348.000	V	48.92	-60.19	0.0	0.56	-60.8	-13.0	47.8

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:1880.000 MHz								
3760.00	H	48.74	-60.06	13.76	1.63	-47.93	-13.00	34.93
3760.00	V	48.12	-60.55	13.76	1.63	-48.42	-13.00	35.42
5640.00	H	55.13	-50.90	14.02	1.31	-38.19	-13.00	25.19
5640.00	V	52.44	-53.47	14.02	1.31	-40.76	-13.00	27.76
272.00	H	42.54	-66.44	0.00	0.51	-66.95	-13.00	53.95
272.00	V	46.37	-65.11	0.00	0.51	-65.62	-13.00	52.62

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.00	H	48.73	-61.51	13.91	1.62	-49.22	-13.00	36.22
3465.00	V	46.84	-63.44	13.91	1.62	-51.15	-13.00	38.15
5197.50	H	56.77	-49.65	14.00	1.52	-37.17	-13.00	24.17
5197.50	V	52.66	-53.83	14.00	1.52	-41.35	-13.00	28.35
357.00	H	43.63	-62.83	0.00	0.57	-63.40	-13.00	50.40
357.00	V	45.89	-63.06	0.00	0.57	-63.63	-13.00	50.63

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency: 836.500 MHz								
1673.00	H	46.52	-67.70	10.61	0.73	-57.82	-13.00	44.82
1673.00	V	46.12	-68.70	10.61	0.73	-58.82	-13.00	45.82
2509.50	H	50.22	-62.80	13.11	1.25	-50.94	-13.00	37.94
2509.50	V	53.39	-59.66	13.11	1.25	-47.80	-13.00	34.80
3346.00	H	46.33	-64.33	13.83	1.61	-52.11	-13.00	39.11
3346.00	V	45.87	-64.84	13.83	1.61	-52.62	-13.00	39.62
311.30	H	55.50	-52.71	0.00	0.53	-53.24	-13.00	40.24
301.60	V	61.56	-48.39	0.00	0.52	-48.91	-13.00	35.91

LTE Band 7 (30MHz-26.5GHz):

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:2535.000 MHz								
5070.00	H	50.13	-56.67	13.93	1.34	-44.08	-25.00	19.08
5070.00	V	47.65	-58.96	13.93	1.34	-46.37	-25.00	21.37
7605.00	H	47.19	-53.17	13.21	1.40	-41.36	-25.00	16.36
7605.00	V	47.25	-53.51	13.21	1.40	-41.70	-25.00	16.70
436.00	H	45.22	-59.38	0.00	0.65	-60.03	-25.00	35.03
436.00	V	47.68	-60.16	0.00	0.65	-60.81	-25.00	35.81

LTE Band 12 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:707.500 MHz								
1415.00	H	45.86	-67.64	9.08	1.22	-59.78	-13.00	46.78
1415.00	V	45.39	-68.64	9.08	1.22	-60.78	-13.00	47.78
2122.50	H	48.57	-64.22	11.27	1.11	-54.06	-13.00	41.06
2122.50	V	47.95	-64.82	11.27	1.11	-54.66	-13.00	41.66
2830.00	H	45.37	-66.71	13.34	1.36	-54.73	-13.00	41.73
2830.00	V	45.70	-66.61	13.34	1.36	-54.63	-13.00	41.63
90.14	H	58.07	-52.41	0.00	0.36	-52.77	-13.00	39.77
140.54	V	62.35	-50.36	0.00	0.35	-50.71	-13.00	37.71

LTE Band 17 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:710.000 MHz								
1420.00	H	45.71	-67.89	9.10	1.23	-60.02	-13.00	47.02
1420.00	V	45.60	-68.50	9.10	1.23	-60.63	-13.00	47.63
2130.00	H	48.61	-64.14	11.22	1.11	-54.03	-13.00	41.03
2130.00	V	48.24	-64.48	11.22	1.11	-54.37	-13.00	41.37
2840.00	H	45.31	-66.73	13.42	1.36	-54.67	-13.00	41.67
2840.00	V	45.47	-66.81	13.42	1.36	-54.75	-13.00	41.75
447.10	H	57.90	-46.64	0.00	0.66	-47.30	-13.00	34.30
519.85	V	56.97	-49.92	0.00	0.72	-50.64	-13.00	37.64

LTE Band 26 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:831.500 MHz								
1663.00	H	45.71	-68.59	10.54	0.72	-58.77	-13.00	45.77
1663.00	V	46.22	-68.68	10.54	0.72	-58.86	-13.00	45.86
2494.50	H	51.47	-61.51	13.06	1.24	-49.69	-13.00	36.69
2494.50	V	52.27	-60.72	13.06	1.24	-48.90	-13.00	35.90
3326.00	H	45.25	-65.47	13.73	1.60	-53.34	-13.00	40.34
3326.00	V	45.46	-65.29	13.73	1.60	-53.16	-13.00	40.16
288.69	H	50.69	-58.09	0.00	0.52	-58.61	-13.00	45.61
377.26	V	58.54	-50.04	0.00	0.59	-50.63	-13.00	37.63

LTE Band 38 (30MHz-26.5 GHz)

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:2595.000 MHz								
5190.00	H	50.01	-56.41	13.99	1.51	-43.93	-25.00	18.93
5190.00	V	49.78	-56.69	13.99	1.51	-44.21	-25.00	19.21
7785.00	H	46.33	-54.11	13.32	1.53	-42.32	-25.00	17.32
7785.00	V	46.54	-54.15	13.32	1.53	-42.36	-25.00	17.36
383.08	H	57.31	-48.15	0.00	0.59	-48.74	-25.00	23.74
235.64	V	57.87	-54.16	0.00	0.50	-54.66	-25.00	29.66

LTE Band 41 (30MHz-26.5GHz)

Frequency (MHz)	Polar (H/V)	Receiver Readin g (dBμV)	Substituted Method			Absolute Level (d Bm)	Limit (d Bm)	Margin (d B)
			Substituted Level (dB m)	Antenna Gain (dB d/dBi)	Cable Loss (dB)			
QPSK,Frequency:2593.000 MHz								
5190.00	H	50.89	-55.52	13.99	1.50	-43.03	-25.00	18.03
5190.00	V	49.36	-57.10	13.99	1.50	-44.61	-25.00	19.61
7785.00	H	47.06	-53.37	13.32	1.53	-41.58	-25.00	16.58
7785.00	V	46.83	-53.86	13.32	1.53	-42.07	-25.00	17.07
358.00	H	43.63	-62.79	0.00	0.57	-63.36	-25.00	38.36
358.00	V	46.88	-62.05	0.00	0.57	-62.62	-25.00	37.62

Note:

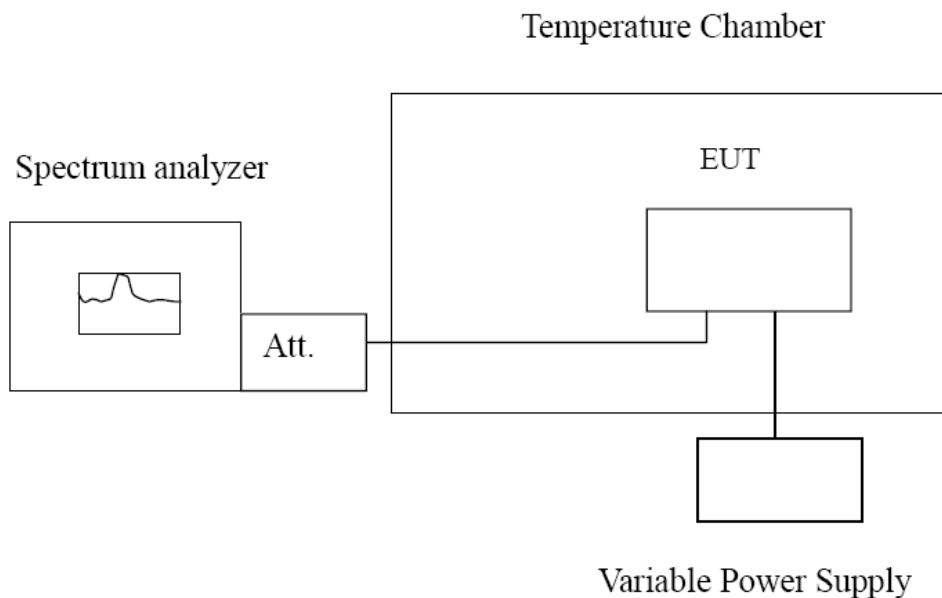
- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit - Absolute Level

3.6 Frequency Stability under Temperature & Voltage Variations

LIMIT

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54 & §90.213

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Frequency Stability Under Temperature Variations:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 5, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1V increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE FDD Band 38, LTE TDD Band 41; recorded worst case for each Channel Bandwidth of GSM 850,GSM 1900,WCDMA Band V , WCDMA Band II ,LTE FDD Band 2, LTE FDD Band 4, LTE FDD Band 5, LTE FDD Band 7, LTE FDD Band 12, LTE FDD Band 17, LTE FDD Band 26, LTE Band 38, LTE TDD Band 41.

Cellular Band (Part 22H)

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	2	0.00239	2.5
-20		-1	-0.00120	
-10		3	0.00359	
0		-12	-0.01434	
10		7	0.00837	
20		-7	-0.00837	
30		4	0.00478	
40		10	0.01195	
50		7	0.00837	
20	8.7	-8	-0.00956	
20	6.6	-13	-0.01554	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	11	0.01315	2.5
-20		3	0.00359	
-10		-5	-0.00598	
0		7	0.00837	
10		8	0.00956	
20		9	0.01076	
30		-5	-0.00598	
40		-7	-0.00837	
50		7	0.00837	
20	8.7	11	0.01315	
20	6.6	-11	-0.01315	

PCS Band (Part 24E)

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	ppm
-30	7.6	-13	-0.00691	Pass
-20		11	0.00585	
-10		6	0.00319	
0		1	0.00053	
10		-1	-0.00053	
20		-6	-0.00319	
30		-2	-0.00106	
40		0	0.00000	
50		-9	-0.00479	
20	8.7	-8	-0.00426	
20	6.6	2	0.00106	

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	ppm
-30	7.6	-4	-0.00213	Pass
-20		6	0.00319	
-10		1	0.00053	
0		-2	-0.00106	
10		-9	-0.00479	
20		-2	-0.00106	
30		-11	-0.00585	
40		9	0.00479	
50		9	0.00479	
20	8.7	11	0.00585	
20	6.6	-7	-0.00372	

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	7.6	-1	-0.00053191	Pass
-20		-2	-0.00106383	
-10		-1	-0.00053191	
0		1	0.00053191	
10		3	0.00159574	
20		-2	-0.00106383	
30		2	0.00106383	
40		-4	-0.00212766	
50		-2	-0.00106383	
20	8.7	-3	-0.00159574	
20	6.6	-5	-0.00265957	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	-6	-0.00717189	2.5
-20		-2	-0.00239063	
-10		-3	-0.00358594	
0		-4	-0.00478126	
10		-4	-0.00478126	
20		1	0.00119531	
30		2	0.00239063	
40		3	0.00358594	
50		-1	-0.00119531	
25	8.7	-3	-0.00358594	
25	6.6	-2	-0.00239063	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	-13.58	-0.00722	Pass
-20		-12.31	-0.00655	
-10		20.77	0.01105	
0		-3.54	-0.00188	
10		-16.26	-0.00865	
20		-2.87	-0.00153	
30		-7.54	-0.00401	
40		6.09	0.00324	
50		13.35	0.00710	
20	8.7	15.98	0.00850	
20	6.6	22.12	0.01177	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	14.63	0.0078	Pass
-20		-11.63	-0.0062	
-10		-8.29	-0.0044	
0		2.29	0.0012	
10		-18.91	-0.0101	
20		-11.16	-0.0059	
30		-7.16	-0.0038	
40		19.36	0.0103	
50		22.17	0.0118	
20	8.7	2.27	0.0012	
20	6.6	-12.27	-0.0065	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1732.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	19	0.010873	Pass
-20		78	0.044635	
-10		8	0.004578	
0		22	0.012589	
10		7	0.004006	
20		7	0.004006	
30		18	0.010300	
40		32	0.018312	
50		97	0.055508	
20	8.7	42	0.024034	
20	6.6	47	0.026896	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1732.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	27	0.015451	Pass
-20		95	0.054363	
-10		87	0.049785	
0		63	0.036052	
10		85	0.048641	
20		37	0.021173	
30		64	0.036624	
40		77	0.044063	
50		95	0.054363	
20	8.7	86	0.049213	
20	6.6	14	0.008011	

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	-20.86	-0.02494	2.5
-20		10.14	0.01212	
-10		-3.05	-0.00365	
0		14.42	0.01724	
10		23.61	0.02822	
20		-15.19	-0.01816	
30		16.95	0.02026	
40		2.63	0.00314	
50		10.29	0.01230	
20	8.7	-21.24	-0.02539	2.5
20	6.6	7.58	0.00906	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	-13.02	-0.01556	2.5
-20		19.30	0.02307	
-10		5.00	0.00598	
0		23.88	0.02855	
10		11.20	0.01339	
20		17.39	0.02079	
30		7.94	0.00949	
40		-4.83	-0.00577	
50		-7.24	-0.00866	
20	8.7	-18.27	-0.02184	2.5
20	6.6	4.47	0.00534	

LTE Band 7:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 2535.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	20	0.007890	2.5
-20		0	0.000000	
-10		-13	-0.005128	
0		-17	-0.006706	
10		-8	-0.003156	
20		-14	-0.005523	
30		-16	-0.006312	
40		-17	-0.006706	
50		12	0.004734	
20	8.7	-3	-0.001183	
20	6.6	5	0.001972	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 2535.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	3	0.001183	2.5
-20		-11	-0.004339	
-10		12	0.004734	
0		-5	-0.001972	
10		10	0.003945	
20		12	0.004734	
30		-19	-0.007495	
40		-20	-0.007890	
50		1	0.000394	
20	8.7	-6	-0.002367	
20	6.6	-7	-0.002761	

LTE Band 12:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 707.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	25	0.035336	2.5
-20		46	0.065018	
-10		40	0.056537	
0		57	0.080565	
10		40	0.056537	
20		26	0.036749	
30		57	0.080565	
40		39	0.055124	
50		26	0.036749	
20	8.7	43	0.060777	
20	6.6	6	0.008481	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 707.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	5	0.007067	2.5
-20		85	0.120141	
-10		7	0.009894	
0		43	0.060777	
10		38	0.053710	
20		63	0.089046	
30		38	0.053710	
40		16	0.022615	
50		54	0.076325	
20	8.7	60	0.084806	
20	6.6	40	0.056537	

LTE Band 17:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 710.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	15	0.021127	2.5
-20		11	0.015493	
-10		-33	-0.046479	
0		3	0.004225	
10		42	0.059155	
20		-37	-0.052113	
30		-13	-0.018310	
40		43	0.060563	
50		43	0.060563	
20	8.7	-3	-0.004225	
20	6.6	11	0.015493	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 710.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	7.6	-42	-0.059155	2.5
-20		19	0.026761	
-10		-17	-0.023944	
0		-2	-0.002817	
10		25	0.035211	
20		-38	-0.053521	
30		21	0.029577	
40		-26	-0.036620	
50		27	0.038028	
20	8.7	-31	-0.043662	
20	6.6	-7	-0.009859	

LTE Band 26:

QPSK, Channel Bandwidth:10MHz Middle				
Channel, f_c =819.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	21	0.025641	Pass
-20		40	0.048840	
-10		98	0.119658	
0		10	0.012210	
10		90	0.109890	
20		74	0.090354	
30		10	0.012210	
40		32	0.039072	
50		92	0.112332	
20	8.7	56	0.068376	
20	6.6	29	0.035409	

16QAM, Channel Bandwidth:10MHz Middle				
Channel, f_c =819.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	-0.14	-0.00017	Pass
-20		-11.80	-0.01419	
-10		7.04	0.00847	
0		-4.98	-0.00599	
10		9.33	0.01122	
20		-1.65	-0.00198	
30		16.50	0.01984	
40		-19.84	-0.02386	
50		-2.34	-0.00281	
20	8.7	-0.58	-0.00070	
20	6.6	-18.04	-0.02170	

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 831.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	
-30	7.6	8	0.009564	Pass
-20		42	0.050209	
-10		44	0.052600	
0		66	0.078900	
10		28	0.033473	
20		90	0.107591	
30		22	0.026300	
40		60	0.071727	
50		84	0.100418	
20	8.7	7	0.008368	
20	6.6	16	0.019127	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 831.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	
-30	7.6	92	0.109982	Pass
-20		83	0.099223	
-10		84	0.100418	
0		46	0.054991	
10		2	0.002391	
20		34	0.040646	
30		32	0.038255	
40		48	0.057382	
50		0	0.000000	
20	8.7	73	0.087268	
20	6.6	54	0.064555	

LTE Band 38:

QPSK, Channel Bandwidth:10MHz Middle				
Channel, $f_c = 2595.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	55	0.021195	Pass
-20		8	0.003083	
-10		25	0.009634	
0		96	0.036994	
10		48	0.018497	
20		96	0.036994	
30		86	0.033141	
40		46	0.017726	
50		61	0.023507	
20	8.7	76	0.029287	
20	6.6	94	0.036224	

16QAM, Channel Bandwidth:10MHz Middle				
Channel, $f_c = 2595.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	35	0.013487	Pass
-20		67	0.025819	
-10		15	0.005780	
0		28	0.010790	
10		86	0.033141	
20		86	0.033141	
30		83	0.031985	
40		15	0.005780	
50		50	0.019268	
20	8.7	24	0.009249	
20	6.6	40	0.015414	

LTE Band 41:

QPSK, Channel Bandwidth:10MHz Middle				
Channel, $f_c = 2595.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	97	0.046345	Pass
-20		88	0.042045	
-10		96	0.045867	
0		31	0.014811	
10		64	0.030578	
20		23	0.010989	
30		50	0.023889	
40		2	0.000956	
50		82	0.039178	
20	8.7	11	0.005256	
20	6.6	16	0.007645	

16QAM, Channel Bandwidth:10MHz Middle				
Channel, $f_c = 2595.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	7.6	40	0.019111	Pass
-20		26	0.012422	
-10		51	0.024367	
0		59	0.028189	
10		73	0.034878	
20		33	0.015767	
30		68	0.032489	
40		86	0.041089	
50		96	0.045867	
20	8.7	19	0.009078	
20	6.6	58	0.027711	

4 Test Setup Photos of the EUT

Reference to the TEST SETUP PHOTOS

5 External and Internal Photos of the EUT

Reference to the EXTERNAL AND INTERNAL PHOTOS

.....End of Report.....