

Test Report

Report No.: MTi220708003-01E4

Date of issue: 2022-08-27

Applicant: SBS S.p.A.

Product name: Fastskin Machine 3.0

Model(s): TEFSTSKINMACHINE30A

FCC ID: 2A7XH-FSTSKIN30

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

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TEST RESULT CERTIFICATION	
Applicant's name	SBS S.p.A.
Address	Via Circonvallazione sn Miasino Italy 28010
Manufacturer's Name	SBS S.p.A.
Address	Via Circonvallazione sn Miasino Italy 28010
Product description	
Product name	Fastskin Machine 3.0
Trademark	SBS
Model Name	TEFSTSKINMACHINE30A
Serial Model	N/A
Standards	FCC CFR 47 Part 22H FCC CFR 47 Part 24E FCC CFR 47 Part 27
Test procedure	ANSI C63.26:2015 ANSI/TIA-603-E-2016 KDB 971168 D01 Power Meas License Digital Systems v03r01
Date of Test	
Date (s) of performance of tests	2022-08-16 ~ 2022-08-27
Test Result	Pass
This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.	

Testing Engineer

:

Eugene Qiu

(Eugene Qiu)

Technical Manager

:

Leon Chen

(Leon Chen)

Authorized Signatory

:

Tom Xue

(Tom Xue)

1 General information

1.1 Feature of equipment under test (EUT)

Product name:	Fastskin Machine 3.0
Model name:	TEFSTSKINMACHINE30A
Serial model:	N/A
Difference in series models:	N/A
Operating frequency range:	LTE FDD Band 2: 1850.7 – 1909.3MHz LTE TDD Band 4: 1710.7 – 1754.3MHz LTE FDD Band 5: 824.7 – 848.3MHz LTE TDD Band 12: 699.7 – 715.3MHz
Modulation type:	QPSK,16QAM
Antenna type:	GPS Antenna
Antenna gain:	Band 2 Gain: 3.50dBi Band 4 Gain: 3.50dBi Band 5 Gain: 1.60dBi Band 12 Gain: 0.4dBi
Power supply:	Input: 24VDC 2A
Adapter information:	1. Adapter: Model: FY047202000H Input: 100-240V~ 50/60Hz 1.5A Output: 24.0V $\approx$ 2.0A
Hardware Version:	PF11002627+PCB1001661
Software Version:	SIM8905B02V01_A8_IT2_DS_CO_data_SIM8905_OVERSEA_8.1_DS_20210528_QCN_PATCH_SIM8950_DS
EUT serial number:	MTi220708003-01-S0001

1.2 Test frequency channel

LTE Band 2		Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]
		Low Range	1.4	18607	1850.7	607	1930.7
			3	18615	1851.5	615	1931.5
			5	18625	1852.5	625	1932.5
			10	18650	1855	650	1935
			15 ^[1]	18675	1857.5	675	1937.5
			20 ^[1]	18700	1860	700	1940
		Mid Range	1.4/3/5/10 15 ^[1] /20 ^[1]	18900	1880	900	1960
		High Range	1.4	19193	1909.3	1193	1989.3
			3	19185	1908.5	1185	1988.5
			5	19175	1907.5	1175	1987.5
			10	19150	1905	1150	1985
			15 ^[1]	19125	1902.5	1125	1982.5
			20 ^[1]	19100	1900	1100	1980
		NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					
LTE Band 4		Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]
		Low Range	1.4	19957	1710.7	1957	2110.7
			3	19965	1711.5	1965	2111.5
			5	19975	1712.5	1975	2112.5
			10	20000	1715	2000	2115
			15	20025	1717.5	2025	2117.5
			20	20050	1720	2050	2120
		Mid Range	1.4/3/5/10/15/20	20175	1732.5	2175	2132.5
		High Range	1.4	20393	1754.3	2393	2154.3
			3	20385	1753.5	2385	2153.5
			5	20375	1752.5	2375	2152.5
			10	20350	1750	2350	2150
			15	20325	1747.5	2325	2147.5
			20	20300	1745	2300	2145
LTE Band 5		Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]
		Low Range	1.4	20407	824.7	2407	869.7
			3	20415	825.5	2415	870.5
			5	20425	826.5	2425	871.5
			10 ^[1]	20450	829	2450	874
		Mid Range	1.4/3/5 10 ^[1]	20525	836.5	2525	881.5
		High Range	1.4	20643	848.3	2643	893.3
			3	20635	847.5	2635	892.5
			5	20625	846.5	2625	891.5
			10 ^[1]	20600	844	2600	889
		NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					
LTE Band 12		Test Frequency ID	Bandwidth [MHz]	N _{UL}	Frequency of Uplink [MHz]	N _{DL}	Frequency of Downlink [MHz]
		Low Range	1.4	23017	699.7	5017	729.7
			3	23025	700.5	5025	730.5
			5 ^[1]	23035	701.5	5035	731.5
			10 ^[1]	23060	704	5060	734
		Mid Range	1.4/3 5 ^[1] /10 ^[1]	23095	707.5	5095	737.5
		High Range	1.4	23173	715.3	5173	745.3
			3	23165	714.5	5165	744.5
			5 ^[1]	23155	713.5	5155	743.5
			10 ^[1]	23130	711	5130	741

1.3 EUT operation mode

LTE band 2	Keep the EUT in data communicating mode on LTE band2. (LTE band2(1.4MHz), LTE band2(3MHz), LTE band2(5MHz), LTE band2(10MHz), band2(15MHz), band2(20MHz)
LTE band 4	Keep the EUT in data communicating mode on LTE band4. (LTE band4(1.4MHz), LTE band4(3MHz), LTE band4(5MHz), LTE band4(10MHz), band4(15MHz), band4(20MHz)
LTE band 5	Keep the EUT in data communicating mode on LTE band5. (LTE band5(1.4MHz), LTE band5(3MHz), LTE band5(5MHz), LTE band5(10MHz)
LTE band 12	Keep the EUT in data communicating mode on LTE band12 (LTE band12(1.4MHz), LTE band12(3MHz), LTE band12(5MHz), LTE band12(10MHz)
Note: Only the worst case data were shown in the report.	

1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
/	/	/	/	/

2 Summary of test results

Item	FCC Part No.	Description of Test	Result
1	Part 2.1046 Part 22.913(a)(2) Part 24.232(c) Part 27.50 (c)(10) Part 27.50 (d)(4)	RF Output Power	Pass*
2	Part 22.913(a) Part 24.232(c) Part 27.50(c)(10) Part 27.50(d)(4) Part 27.50(a)(3)	Radiated Power (ERP/EIRP)	Pass
3	Part 24.232(c) Part 27.50(d)(5)	Peak-to-Average Ratio	Pass*
4	Part 2.1049 Part 22.917(b) Part 24.238(b) Part 27.53(g) Part 27.53(h)	99% and -26 dB Occupied Bandwidth	Pass*
5	Part 2.1051 Part 22.917(a) Part 24.238(a) Part 27.53 (g)(h)	Spurious emissions at antenna terminals	Pass
6	Part 2.1051 Part 22.917(b) Part 24.238(b) Part 27.53(c)(2)(4) Part 27.53(g) Part 27.53(h)	Band edge at antenna terminals	Pass*
7	Part 2.1053 Part 22.917(a) Part 24.238(a) Part 27.53 (g) Part 27.53 (h)	Field strength of spurious radiation measurement	Pass
8	Part 22.355 Part 24.235 Part 27.54 Part 2.1055(a)(1)(b) Part 2.1055(d)(2)	Frequency Stability for Temperature & Voltage	Pass*

Note:

*reference to the module which FCC ID is 2AJYU-8PSA301

3 Test facilities and accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
FCC Registration No.:	448573

3.2 Environmental conditions

Temperature:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2 \times U_c(y)$

Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
LTE	Shenzhen JS tonskend co.,ltd	JS1120-1	2.6.8.0518

4 LIST OF TEST EQUIPMENT

[illegible]

5 Test result

5.1 Radiated Power (ERP/EIRP)

5.1.1 Description

This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 27.50(d) specifies "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP".

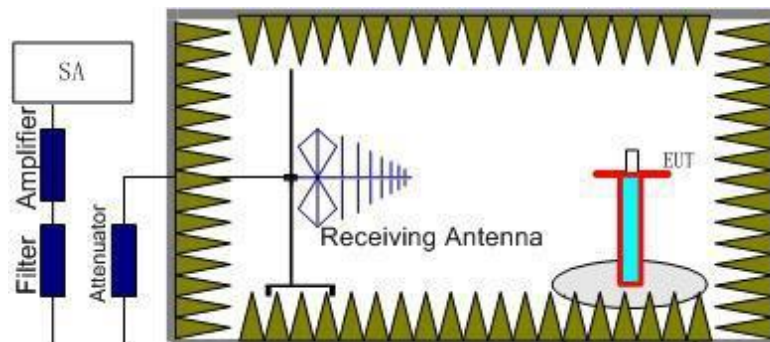
Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

Rule Part 27.50(c) specifies "Portable stations (hand-held de-vices) are limited to 3 watts ERP".

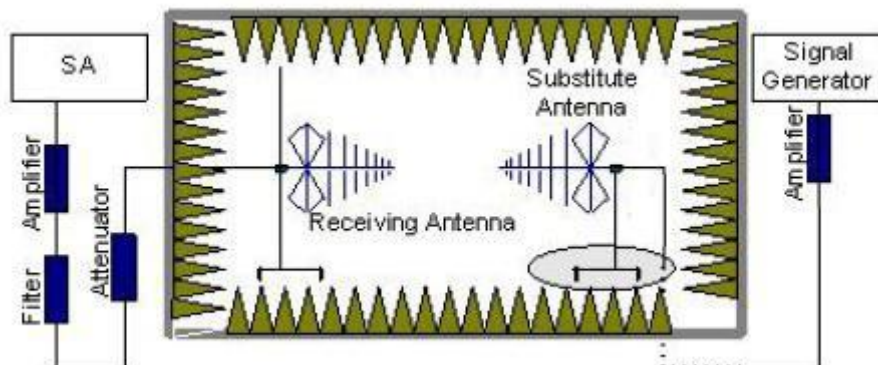
5.1.2 Method of Measurement

The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (P_r).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a 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 (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below: Power (EIRP) = $P_{Mea} + P_{Ag} - P_{cl} + G_a$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15$.

5.1.3 Test results

NOTE:

1. The antenna was tested in both vertical and horizontal directions, and only the worst horizontal direction was recorded in the report.

2. RB Size & RB Position for the worst mode only recorded.

LTE Band 2- EIRP 24. 232(b)

Limits: $\leq 33\text{dBm}$ (2W)

LTE Band 2_1.4MHz_QPSK_1RB, Poition #5

Frequency(MHz)	$P_{Mea}(\text{dBm})$	$P_{cl}(\text{dB})$	$P_{Ag}(\text{dB})$	G_a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.70	-8.82	4.6	36.0	3.50	26.08	33.00	6.92	H
1880.00	-8.1	4.6	35.6	3.50	26.4	33.00	6.6	H
1909.30	-8.07	4.7	35.9	3.50	26.63	33.00	6.37	H

LTE Band 2_3MHz_QPSK_1RB, Poition #15

Frequency(MHz)	$P_{Mea}(\text{dBm})$	$P_{cl}(\text{dB})$	$P_{Ag}(\text{dB})$	G_a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1851.50	-8.71	4.6	36.0	3.50	26.19	33.00	6.81	H
1880.00	-8.05	4.6	35.6	3.50	26.45	33.00	6.55	H
1908.50	-8.05	4.7	35.9	3.50	26.65	33.00	6.35	H

LTE Band 2_5MHz_QPSK_1RB, Poition #24

Frequency(MHz)	$P_{Mea}(\text{dBm})$	$P_{cl}(\text{dB})$	$P_{Ag}(\text{dB})$	G_a Antenna Gain(dBi))	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1852.50	-8.94	4.6	36.0	3.50	25.96	33.00	7.04	H
1880.00	-7.95	4.6	35.6	3.50	26.55	33.00	6.45	H
1907.50	-8.16	4.7	35.9	3.50	26.54	33.00	6.46	H

LTE Band 2_10MHz_QPSK_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1855.00	-8.74	4.6	36.0	3.50	26.16	33.00	6.84	H
1880.00	-7.8	4.6	35.6	3.50	26.7	33.00	6.3	H
1905.00	-7.91	4.7	35.9	3.50	26.79	33.00	6.21	H

LTE Band 2_15MHz_QPSK_1RB, Poition #74

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1857.50	-8.53	4.6	36.0	3.50	26.37	33.00	6.63	H
1880.00	-7.89	4.6	35.6	3.50	26.61	33.00	6.39	H
1902.50	-7.8	4.7	36.0	3.50	27.00	33.00	6.00	H

LTE Band 2_20 MHz_QPSK_1RB, Poition #99

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1860.00	-8.46	4.6	36.0	3.50	26.44	33.00	6.56	H
1880.00	-8.04	4.6	35.6	3.50	26.46	33.00	6.54	H
1900.00	-8.16	4.7	36.4	3.50	27.04	33.00	5.96	H

LTE Band 2_1.4MHz_16QAM_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.70	-8.6	4.6	36.0	3.50	26.30	33.00	6.70	H
1880.00	-8.05	4.6	35.6	3.50	26.45	33.00	6.55	H
1909.30	-8.11	4.7	35.9	3.50	26.59	33.00	6.41	H

LTE Band 2_3MHz_16QAM_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1851.50	-8.6	4.6	36	3.5	26.30	33.00	6.70	H
1880.00	-8.05	4.6	35.6	3.5	26.45	33.00	6.55	H
1908.50	-8.11	4.7	35.9	3.5	26.59	33.00	6.41	H

LTE Band 2_5MHz_16QAM_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1852.50	-8.75	4.6	36.0	3.50	26.15	33.00	6.85	H
1880.00	-7.74	4.6	35.6	3.50	26.76	33.00	6.24	H
1907.50	-8.18	4.7	35.9	3.50	26.52	33.00	6.48	H

LTE Band 2_10MHz_16QAM_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1855.00	-8.34	4.6	36.0	3.50	26.56	33.00	6.44	H
1880.00	-7.76	4.6	35.6	3.50	26.74	33.00	6.26	H
1905.00	-7.65	4.7	35.9	3.50	27.05	33.00	5.95	H

LTE Band 2_15MHz_16QAM_1RB, Poition #74

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1857.50	-8.36	4.6	36.0	3.50	26.54	33.00	6.46	H
1880.00	-7.82	4.6	35.6	3.50	26.68	33.00	6.32	H
1902.50	-7.88	4.7	36.0	3.50	26.92	33.00	6.08	H

LTE Band 2_20 MHz_16QAM_1RB, Poition #99

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1860.00	-8.5	4.6	36.0	3.50	26.40	33.00	6.60	H
1880.00	-7.81	4.6	35.6	3.50	26.69	33.00	6.31	H
1900.00	-8.23	4.7	36.4	3.50	26.97	33.00	6.03	H

Peak EIRP(dBm) = P_{Mea}(-7.65dBm) + G_a (3.5dBi) + P_{Ag} (35.9dB) - P_{cl} (4.7dB) = 27.05dBm

LTE Band 4- EIRP 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1710.70	-13.62	4.4	36.2	3.50	21.68	30.00	8.32	H
1732.50	-12.78	4.4	36.1	3.50	22.42	30.00	7.58	H
1754.30	-11.89	4.5	36.4	3.50	23.51	30.00	6.49	H

LTE Band 4_3MHz_QPSK_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1711.50	-13.62	4.4	36.2	3.50	21.68	30.00	8.32	H
1732.50	-12.8	4.4	36.1	3.50	22.40	30.00	7.60	H
1753.50	-11.95	4.5	36.4	3.50	23.45	30.00	6.55	H

LTE Band 4_5MHz_QPSK_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1712.50	-13.89	4.4	36.2	3.50	21.41	30.00	8.59	H
1732.50	-12.68	4.4	36.1	3.50	22.52	30.00	7.48	H
1752.50	-12.23	4.5	36.5	3.50	23.27	30.00	6.73	H

LTE Band 4_10MHz_QPSK_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1715.00	-13.59	4.4	36.2	3.50	21.71	30.00	8.29	H
1732.50	-12.76	4.4	36.1	3.50	22.44	30.00	7.56	H
1750.50	-11.74	4.5	36.1	3.50	23.36	30.00	6.64	H

LTE Band 4_15MHz_QPSK_1RB, Poition #74

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1717.50	-13.46	4.4	36.2	3.50	21.84	30.00	8.16	H
1732.50	-12.95	4.4	36.1	3.50	22.25	30.00	7.75	H
1747.50	-11.98	4.5	36.5	3.50	23.52	30.00	6.48	H

LTE Band 4_20MHz_QPSK_1RB, Poition #99

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1720.00	-13.3	4.4	36.2	3.50	22.00	30.00	8.00	H
1732.50	-12.92	4.4	36.1	3.50	22.28	30.00	7.72	H
1745.00	-11.07	4.5	35.8	3.50	23.73	30.00	6.27	H

LTE Band 4_1.4MHz_16QAM_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1710.70	-13.4	4.4	36.2	3.50	21.90	30.00	8.10	H
1732.50	-12.89	4.4	36.1	3.50	22.31	30.00	7.69	H
1754.30	-11.89	4.5	36.4	3.50	23.51	30.00	6.49	H

LTE Band 4_3MHz_16QAM_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1711.50	-13.35	4.4	36.2	3.50	21.95	30.00	8.05	H
1732.50	-12.99	4.4	36.1	3.50	22.21	30.00	7.79	H
1753.50	-11.95	4.5	36.4	3.50	23.45	30.00	6.55	H

LTE Band 4_5MHz_16QAM_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1712.50	-13.79	4.4	36.2	3.50	21.51	30.00	8.49	H
1732.50	-12.9	4.4	36.1	3.50	22.30	30.00	7.70	H
1752.50	-12.22	4.5	36.5	3.50	23.28	30.00	6.72	H

LTE Band 4_10MHz_16QAM_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1715.00	-13.65	4.4	36.2	3.50	21.65	30.00	8.35	H
1732.50	-12.99	4.4	36.1	3.50	22.21	30.00	7.79	H
1750.50	-11.56	4.5	36.1	3.50	23.54	30.00	6.46	H

LTE Band 4_15MHz_16QAM_1RB, Poition #74

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1717.50	-13.42	4.4	36.2	3.50	21.88	30.00	8.12	H
1732.50	-12.91	4.4	36.1	3.50	22.29	30.00	7.71	H
1747.50	-12.17	4.5	36.5	3.50	23.33	30.00	6.67	H

LTE Band 4_20MHz_16QAM_1RB, Poition #99

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1720.00	-13.52	4.4	36.2	3.50	21.78	30.00	8.22	H
1732.50	-13.12	4.4	36.1	3.50	22.08	30.00	7.92	H
1745.00	-11.1	4.5	35.8	3.50	23.70	30.00	6.30	H

$$\text{Peak EIRP(dBm)} = P_{\text{Mea}}(-11.07\text{dBm}) + G_a(3.50\text{dBi}) + P_{\text{Ag}}(35.8\text{dB}) - P_{\text{cl}}(4.5\text{dB}) = 23.73\text{dBm}$$

LTE Band 5- ERP 22.913(a)

Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.70	-4.98	3.1	36.8	1.60	28.17	38.45	8.13	H
836.50	-5.43	3.1	37.1	1.60	28.02	38.45	8.28	H
848.30	-5.78	3.1	36.9	1.60	27.47	38.45	8.83	H

LTE Band 5_3MHz_QPSK_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
825.50	-5.74	3.1	36.9	1.60	27.51	38.45	8.79	H
836.50	-5.81	3.1	37.1	1.60	27.64	38.45	8.66	H
847.50	-6.11	3.1	37.0	1.60	27.24	38.45	9.06	H

LTE Band 5_5MHz_QPSK_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
826.50	-6.14	3.1	37.0	1.60	27.21	38.45	9.09	H
836.50	-6.06	3.1	37.1	1.60	27.39	38.45	8.91	H
846.50	-6.39	3.1	37.0	1.60	26.96	38.45	9.34	H

LTE Band 5_10MHz_QPSK_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
829.00	-5.91	3.1	37.0	1.60	27.44	38.45	8.86	H
836.50	-5.91	3.1	37.1	1.60	27.54	38.45	8.76	H
844.00	-6.2	3.1	36.9	1.60	27.05	38.45	9.25	H

LTE Band 5_1.4MHz_16QAM_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
824.70	-5.44	3.1	36.8	1.60	27.71	38.45	8.59	H
836.50	-6.06	3.1	37.1	1.60	27.39	38.45	8.91	H
848.30	-6.1	3.1	36.9	1.60	27.15	38.45	9.15	H

LTE Band 5_3MHz_16QAM_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
825.50	-5.51	3.1	36.9	1.60	27.74	38.45	8.56	H
836.50	-6.01	3.1	37.1	1.60	27.44	38.45	8.86	H
847.50	-6.16	3.1	37.0	1.60	27.19	38.45	9.11	H

LTE Band 5_5MHz_16QAM_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
826.50	-5.81	3.1	37.0	1.60	27.54	38.45	8.76	H
836.50	-6.01	3.1	37.1	1.60	27.44	38.45	8.86	H
846.50	-6.24	3.1	37.0	1.60	27.11	38.45	9.19	H

LTE Band 5_10MHz_16QAM_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
829.00	-5.72	3.1	37.0	1.60	27.63	38.45	8.67	H
836.50	-5.96	3.1	37.1	1.60	27.49	38.45	8.81	H
844.00	-6.12	3.1	36.9	1.60	27.13	38.45	9.17	H

Peak ERP(dBm)= EIRP(dBm)-2.15= 30.32dBm-2.15=28.17dBm

LTE Band 12 - ERP 27.50(c)(10)

Limits: ≤34.77dBm (3W)

LTE Band 12_1.4MHz_QPSK_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
699.70	-14.39	2.8	37.1	0.4	18.16	34.77	14.46	H
707.50	-14.15	2.8	37.1	0.4	18.4	34.77	14.22	H
715.30	-14.21	2.8	37.3	0.4	18.54	34.77	14.08	H

LTE Band 12_3MHz_QPSK_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
700.50	-14.35	2.8	37.1	0.4	18.2	34.77	14.42	H
707.50	-14.23	2.8	37.1	0.4	18.32	34.77	14.30	H
714.50	-14.13	2.8	37.1	0.4	18.42	34.77	14.20	H

LTE Band 12_5MHz_QPSK_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
701.50	-14.68	2.8	37.1	0.4	17.87	34.77	14.75	H
707.50	-14.43	2.8	37.1	0.4	18.12	34.77	14.50	H
713.50	-14.17	2.8	37.1	0.4	18.38	34.77	14.24	H

LTE Band 12_10MHz_QPSK_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
704.00	-14.68	2.8	37.1	0.4	17.87	34.77	14.75	H
707.50	-14.32	2.8	37.1	0.4	18.23	34.77	14.39	H
711.00	-14.37	2.8	37.1	0.4	18.18	34.77	14.44	H

LTE Band 12_1.4MHz_16QAM_1RB, Poition #5

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
699.70	-13.98	2.8	37.1	0.4	18.57	34.77	14.05	H
707.50	-14.29	2.8	37.1	0.4	18.26	34.77	14.36	H
715.30	-14.06	2.8	37.3	0.4	18.69	34.77	13.93	H

LTE Band 12_3MHz_16QAM_1RB, Poition #15

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
700.50	-14.22	2.8	37.1	0.4	18.33	34.77	14.29	H
707.50	-14.33	2.8	37.1	0.4	18.22	34.77	14.40	H
714.50	-13.87	2.8	37.1	0.4	18.68	34.77	13.94	H

LTE Band 12_5MHz_16QAM_1RB, Poition #24

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
701.50	-14.44	2.8	37.1	0.4	18.11	34.77	14.51	H
707.50	-14.37	2.8	37.1	0.4	18.18	34.77	14.44	H
713.50	-14.3	2.8	37.1	0.4	18.25	34.77	14.37	H

LTE Band 12_10MHz_16QAM_1RB, Poition #49

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dBi)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
704.00	-14.63	2.8	37.1	0.4	17.92	34.77	14.70	H
707.50	-14.47	2.8	37.1	0.4	18.08	34.77	14.54	H
711.00	-14.16	2.8	37.1	0.4	18.39	34.77	14.23	H

Peak ERP(dBm)= EIRP(dBm)-2.15= 20.84dBm-2.15=18.69dBm

ANALYZER SETTINGS:

RBW = VBW = 8MHz for occupied bandwidths equal to or less than 5MHz.

RBW = VBW = 20MHz for occupied bandwidths equal to or greater than 10MHz.



5.2 Field strength of spurious radiation measurement

5.2.1 Limit

LTE Band 2/4/5/12/13/17/25/26/66/71: -13dBm;

LTE Band 7/38/41: -25dBm

5.2.2 Test procedure

1. Place the EUT in the center of the turntable.
 - a) For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, the EUT shall be placed on a RF-transparent table at a nominal height of 80 cm above the reference ground plane
 - b) For radiated measurements performed at frequencies above 1 GHz, the EUT shall be placed on an RF transparent table at a nominal height of 1.5 m above the ground plane.
2. Unless the EUT uses an integral antenna, the EUT shall be terminated with a non-radiating transmitter load. In cases where the EUT uses an adjustable antenna, the antenna shall be adjusted through typical positions and lengths to maximize emissions levels.
3. The EUT shall be tested while operating on the frequency per manufacturer specification. Set the transmitter to operate in continuous transmit mode.
4. Receiver or Spectrum set as follow:

Below 1GHz, RBW=100kHz, VBW=300kHz, Detector=Peak, Sweep time=Auto

Above 1GHz, RBW=1MHz, VBW=3MHz, Detector=Peck, Sweep time=Auto
5. Each emission under consideration shall be evaluated:
 - a) Raise and lower the measurement antenna from 1 m to 4 m, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
 - b) Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
 - c) Return the turntable to the azimuth where the highest emission amplitude level was observed.
 - d) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.



- e) Record the measured emission amplitude level and frequency
6. Repeat step 5 for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
 7. Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
 8. Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
 9. Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
 10. For each emission that was detected and measured in the initial test
 - a) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
 - b) Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step 5 and step 6.
 - c) Record the output power level of the signal generator when equivalence is achieved in step b).
 11. Repeat step 8 through step 10 with the measurement antenna oriented in the opposite polarization.
 12. Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:
$$P_e = P_s(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dBd)}$$
where
 P_e = equivalent emission power in dBm
 P_s = source (signal generator) power in dBm
NOTE—dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.
 13. Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain



specified in dBi, the equivalent dipole-referenced gain can be determined from:

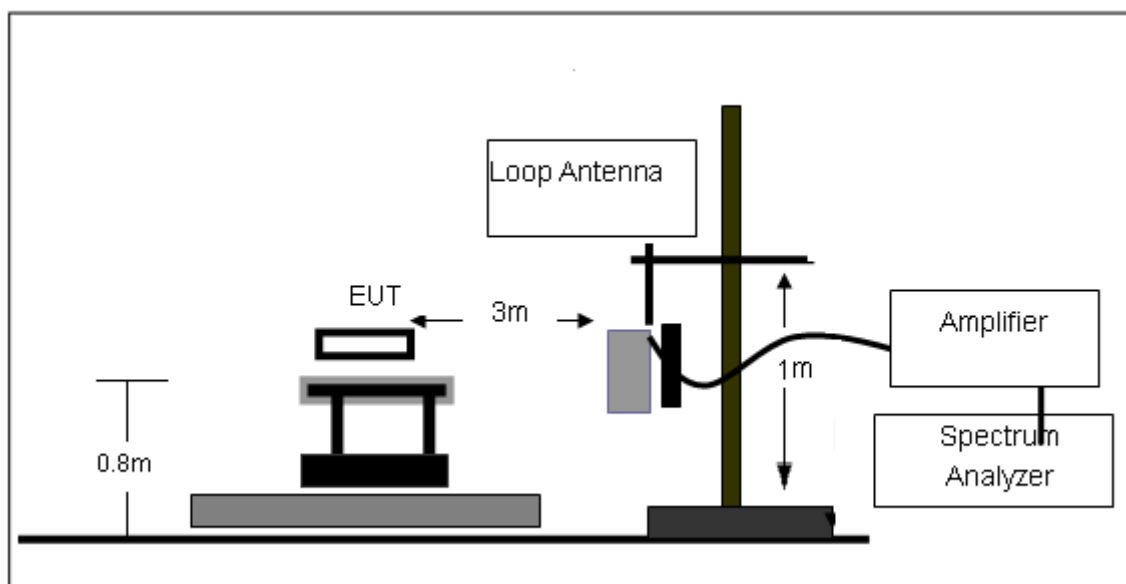
$$\text{gain (dBd)} = \text{gain (dBi)} - 2.15 \text{ dB.}$$

If necessary, the antenna gain can be calculated from calibrated antenna factor information

14. Provide the complete measurement results as a part of the test report.

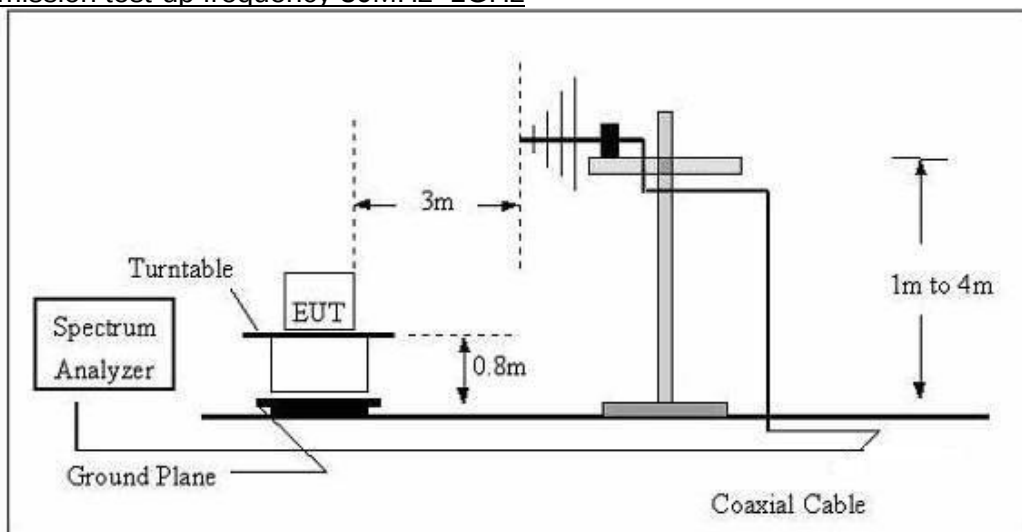
5.2.3 Test setup

Radiated emission test-up frequency below 30MHz





Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz

†

5.2.4 Test results

Band 2:Middle:1880MHz-20MHz-QPSK

Frequency(MHz)	Reading Level(dBm)	Correct Factor(dB)	Measurement(dBm)	Limit(dBm)	Margin	Polarization	Result
277.0935	-65.13	16.13	-49.00	-13	-36.00	H	Pass
410.3824	-64.18	19.5	-44.68	-13	-31.68	H	Pass
603.5392	-64.04	21.6	-42.44	-13	-29.44	H	Pass
12404.81	-64.85	13.15	-51.70	-13	-38.70	H	Pass
14905.812	-58.09	16.21	-41.88	-13	-28.88	H	Pass
15851.703	-60.10	4.08	-56.02	-13	-43.02	H	Pass
18639.4	-58.88	12.35	-46.53	-13	-33.53	H	Pass
18857.5	-60.45	10.36	-50.09	-13	-37.09	H	Pass
100.2286	-64.68	14.67	-50.01	-13	-37.01	V	Pass
148.441	-64.67	12.37	-52.30	-13	-39.30	V	Pass
478.8455	-62.55	20.86	-41.69	-13	-28.69	V	Pass
11282.565	-59.51	9.96	-49.55	-13	-36.55	V	Pass
12340.681	-62.05	11.01	-51.04	-13	-38.04	V	Pass
12965.932	-62.72	12.01	-50.71	-13	-37.71	V	Pass
17965.3	-60.48	10.36	-50.12	-13	-37.12	V	Pass
17984.9	-59.25	11.52	-47.73	-13	-34.73	V	Pass

Band 4:Middle:1732.5MHz-20MHz-QPSK

Frequency(MHz)	Reading Level(dBm)	Correct Factor(dB)	Measurement(dBm)	Limit(dBm)	Margin	Polarization	Result
369.4045	-63.93	18.49	-45.44	-13	-32.44	H	Pass
459.1143	-63.63	20.47	-43.16	-13	-30.16	H	Pass
656.53	-62.08	22.16	-39.92	-13	-26.92	H	Pass
12741.483	-61.93	11.68	-50.25	-13	-37.25	H	Pass
14008.016	-59.20	17.12	-42.08	-13	-29.08	H	Pass
14505.01	-57.53	16.65	-40.88	-13	-27.88	H	Pass
17521.14	-58.70	15.98	-42.72	-13	-29.72	H	Pass
17634.09	-59.62	17.32	-42.30	-13	-29.30	H	Pass
212.2694	-63.24	14.34	-48.90	-13	-35.90	V	Pass
325.5957	-64.83	17.34	-47.49	-13	-34.49	V	Pass
431.0316	-63.43	19.91	-43.52	-13	-30.52	V	Pass
13783.567	-60.78	16.67	-44.11	-13	-31.11	V	Pass
14232.465	-58.78	17.11	-41.67	-13	-28.67	V	Pass
14905.812	-58.37	16.21	-42.16	-13	-29.16	V	Pass
17102.02	-58.63	16.34	-42.29	-13	-29.29	V	Pass
17235.61	-53.93	17.42	-36.51	-13	-23.51	V	Pass



Band 5:Middle:836.5MHz-10MHz-QPSK

Frequency(MHz)	Reading Level(dBm)	Correct Factor(dB)	Measurement(dBm)	Limit(dBm)	Margin	Polarization	Result
280.0935	-64.95	16.13	-48.82	-13	-35.82	H	Pass
415.3824	-64.36	19.5	-44.86	-13	-31.86	H	Pass
650.5392	-63.50	21.6	-41.90	-13	-28.90	H	Pass
12404.88	-64.99	13.15	-51.84	-13	-38.84	H	Pass
14925.812	-58.10	16.21	-41.89	-13	-28.89	H	Pass
1571.7031	-60.40	4.08	-56.32	-13	-43.32	H	Pass
18644.44	-58.43	12.35	-46.08	-13	-33.08	H	Pass
18837.5	-60.84	10.36	-50.48	-13	-37.48	H	Pass
140.2277	-64.25	14.67	-49.58	-13	-36.58	V	Pass
160.441	-64.00	12.37	-51.63	-13	-38.63	V	Pass
500.845	-62.16	20.86	-41.30	-13	-28.30	V	Pass
11326.56	-60.08	9.96	-50.12	-13	-37.12	V	Pass
12340.674	-62.10	11.01	-51.09	-13	-38.09	V	Pass
12953.933	-61.89	12.01	-49.88	-13	-36.88	V	Pass
17865.38	-60.38	10.36	-50.02	-13	-37.02	V	Pass
17984.91	-58.96	11.52	-47.44	-13	-34.44	V	Pass

Band 12:Middle:707.5MHz-10MHz-QPSK

Frequency(MHz)	Reading Level(dBm)	Correct Factor(dB)	Measurement(dBm)	Limit(dBm)	Margin	Polarization	Result
369.4045	-63.56	18.49	-45.07	-13	-32.07	H	Pass
412.113	-62.95	20.47	-42.48	-13	-29.48	H	Pass
656.53	-61.57	22.16	-39.41	-13	-26.41	H	Pass
12541.483	-62.18	11.68	-50.50	-13	-37.50	H	Pass
14008.016	-59.61	17.12	-42.49	-13	-29.49	H	Pass
14335.01	-58.19	16.65	-41.54	-13	-28.54	H	Pass
17521.14	-58.79	15.98	-42.81	-13	-29.81	H	Pass
17744.09	-58.98	17.32	-41.66	-13	-28.66	H	Pass
232.269	-63.29	14.34	-48.95	-13	-35.95	V	Pass
325.5957	-64.16	17.34	-46.82	-13	-33.82	V	Pass
451.0316	-62.87	19.91	-42.96	-13	-29.96	V	Pass
13783.567	-60.66	16.67	-43.99	-13	-30.99	V	Pass
14232.465	-59.06	17.11	-41.95	-13	-28.95	V	Pass
14785.812	-58.77	16.21	-42.56	-13	-29.56	V	Pass
17102.02	-58.49	16.34	-42.15	-13	-29.15	V	Pass
17105.611	-53.44	17.42	-36.02	-13	-23.02	V	Pass

Note: All the configuration was tested and only the worse case was reported.



Photographs of the Test Setup

See the APPENDIX 1- Test Setup PHOTO.



Photographs of the EUT

See the APPENDIX 1- EUT PHOTO.

----END OF REPORT----