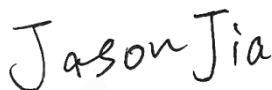


FCC RF Test Report

APPLICANT : Telrad Networks Ltd
EQUIPMENT : CPE-12300XG-PRO-1D-3.x
BRAND NAME : Telrad
MODEL NAME : 735330
FCC ID : ARA-CPE12300XG
STANDARD : 47 CFR Part 2, 96
CLASSIFICATION : Citizens Band Category A and B Devices (CBD)
EQUIPMENT TYPE : CBSD (Category B)

The product was received on Mar. 02, 2021 and completely tested on Mar. 12, 2021. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Reviewed by: Jason Jia / Supervisor



Approved by: Alex Wang / Manager



Sporton International (Kunshan) Inc.

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 Applicant.....	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test.....	5
1.4 Re-use of Measured Data	6
1.5 Maximum EIRP Power, Frequency Tolerance, and Emission Designator	7
1.6 Testing Site.....	7
1.7 Test Software	7
1.8 Applied Standards	8
2 Test Configuration of Equipment Under Test	9
2.1 Test Mode.....	9
2.2 Connection Diagram of Test System	9
2.3 Support Unit used in test configuration	10
2.4 Frequency List of Low/Middle/High Channels	10
3 Conducted Test Items.....	11
3.1 Measuring Instruments.....	11
3.2 Conducted Output Power	11
3.3 EIRP	12
4 Radiated Test Items	14
4.1 Measuring Instruments.....	14
4.2 Test Setup	14
4.3 Test Result of Radiated Test.....	14
4.4 Radiated Spurious Emission	15
5 List of Measuring Equipment.....	16
6 Uncertainty of Evaluation	17
Appendix A. Test Results of Conducted Test	
Appendix B. Test Results of EIRP and Radiated Test	
Appendix C. Test Setup Photographs	
Appendix D. Reference Report	

History of this test report

Report No.	Version	Description	Issued Date
FG072303-04	01	Initial issue of report	Apr. 06, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
3.3	§96.41	Maximum E.I.R.P	Pass	-
		Maximum Power Spectral Density	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 4.91 dB at 14466.000 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

1 General Description

1.1 Applicant

Telrad Networks Ltd
Industrial Center PO Box 6118 Lod, 711600 Israel

1.2 Manufacturer

Asiatelco
No.68 Huatuo Road,Building-8,Zhangjiang Hi-Tech Park,Pudong,Shanghai,PRC

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	CPE-12300XG-PRO-1D-3.x
Brand Name	Telrad
Model Name	735330
FCC ID	ARA-CPE12300XG
Tx Frequency	LTE Band 42 : 3550 MHz ~ 3600 MHz LTE Band 43 : 3600 MHz ~ 3700 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz
Rx Frequency	LTE Band 42 : 3550 MHz ~ 3600 MHz LTE Band 43 : 3600 MHz ~ 3700 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Type of Modulation	QPSK / 16QAM / 64QAM (Uplink) QPSK / 16QAM / 64QAM / 256QAM (Downlink)
Antenna Gain	20 dBi
IMEI Code	Radiation: 863867028225660
HW Version	P1
SW Version	KT2A_OTE30_TRD_1.0.0.1
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Re-use of Measured Data

1.4.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: 735330, FCC ID: ARA-CPE12300XG) is electrically identical to the reference device (Model: 735350, FCC ID: ARA-CPE12300HG) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

1.4.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FG072303 for the reference device Model: 735350, FCC ID: ARA-CPE12300HG).

1.4.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
CBD	ARA-CPE12300HG	Part96 (FG072303)	All sections applicable except EIRP and RSE

1.4.4 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the following test items, the test result were consistent with FCC ID: ARA-CPE12300HG.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

Test Item	Mode	ARA-CPE12300HG Worst Result	ARA-CPE12300XG Worst Result	Difference (dB)
Average Conducted Power (dBm)	LTE Band 48	22.11	21.63	0.48

1.5 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

LTE Band 48		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP (W)
20	3560~3690	-	-	14.6218	-	-	13.8357
15	3557.5~3692.5	-	-	16.2555	-	-	13.5519

Note: Based on engineering evaluation, only the maximum bandwidth and the worst modulation test results are shown in the report.

1.6 Testing Site

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a



1.8 Applied Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ 47 CFR Part 2, 96
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 940660 D01 Part 96 CBRS v03
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

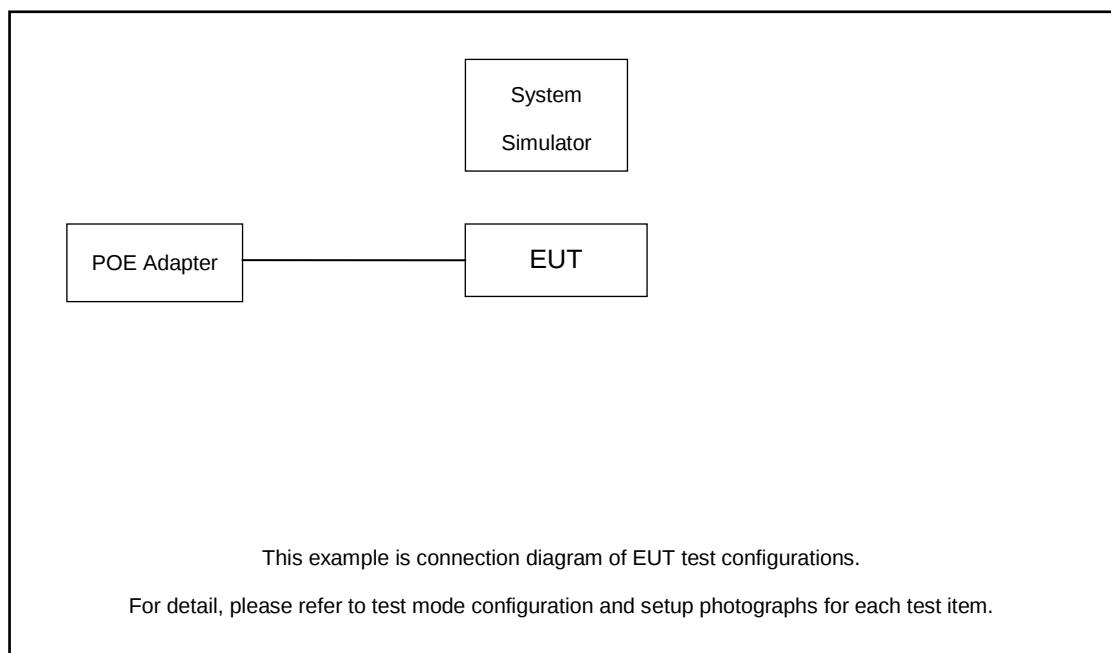
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
E.R.P / E.I.R.P	48	-	-	v	v	v	v	v	v	v			v	v	v	v
EIRP Density	48	-	-	v	v	v	v	v	v	v			v	v	v	v
Radiated Spurious Emission	48	Worst Case												v	v	v
Remark	1. The mark “v ” means that this configuration is chosen for testing 2. The mark “-“ means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. All the radiated test cases were performed with Adapter. 5. Only full RB is support by manufacturer declared. 6. LTE Band 48 overlaps the entire frequency range of LTE Band 42/43. Therefore, the test results provided in this report covers Band 48 as well as Band 42/43.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m

2.4 Frequency List of Low/Middle/High Channels

LTE Band 48 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	55340	55990	56640
	Frequency	3560.0	3625.0	3690.0
15	Channel	55315	55990	56665
	Frequency	3557.5	3625.0	3692.5
10	Channel	55290	55990	56690
	Frequency	3555.0	3625.0	3695.0
5	Channel	55265	55990	56715
	Frequency	3552.5	3625.0	3697.5

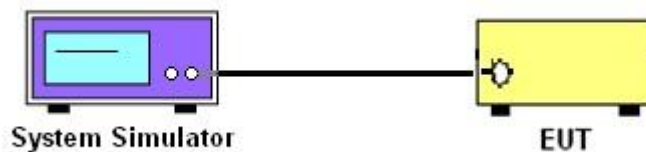
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 EIRP and PSD

3.3.1 Description of the EIRP Measurement

EIRP and PSD limits for CBRS equipment as below table:

Device		Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/MHz)
	End User Device	23	n/a
	Category A CBSD	30	20
V	Category B CBSD	47	37

Remark:

1. Maximum PSD values are radiated. Measurements can be done conducted and add antenna gain back in.
2. This device is Category B CBSD.

3.3.2 Test Procedures for EIRP

1. Establishing a communications link with the call box (Base station) to measure the Maximum conducted power, the parameters were set to force the EUT transmitting at maximum output power level. Use the average power measurement function to measure total channel power of each channel bandwidth (per ANSI C63.26-2015 Section 5.2.1)
2. Determining ERP and/or EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)
$$\text{EIRP} = P_T + G_T - L_C, \text{ ERP} = \text{EIRP} - 2.15, \text{ where}$$
$$P_T = \text{transmitter output power in dBm}$$
$$G_T = \text{gain of the transmitting antenna in dBi}$$
$$L_C = \text{signal attenuation in the connecting cable between the transmitter and antenna in dB}$$

3.3.3 Test Procedures for EIRP PSD

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 2 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW $\geq 3 \times$ RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
7. Sweep time = auto couple.
8. Employ trace averaging (RMS) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).
10. Determine the EIRP by adding the effective antenna gain to the adjusted power level.
11. Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

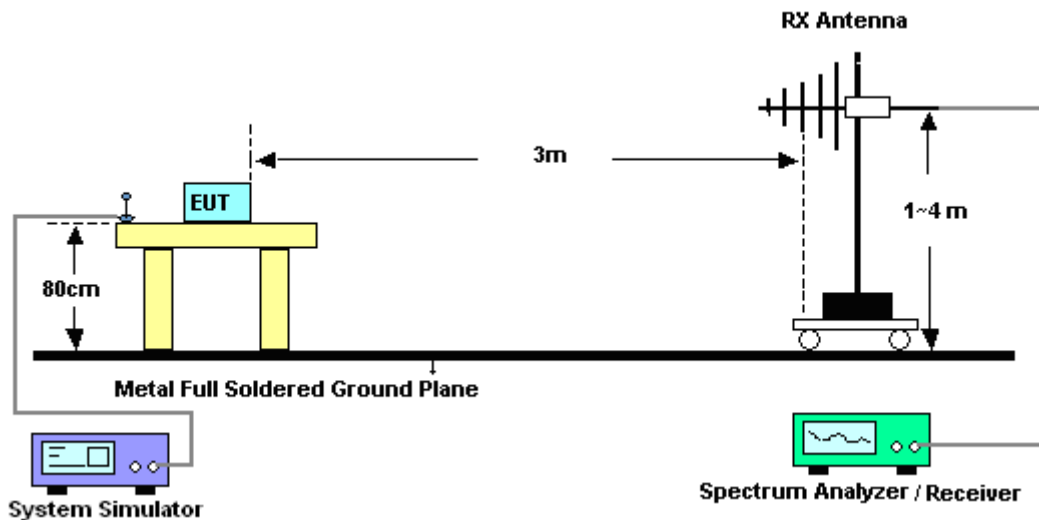
4 Radiated Test Items

4.1 Measuring Instruments

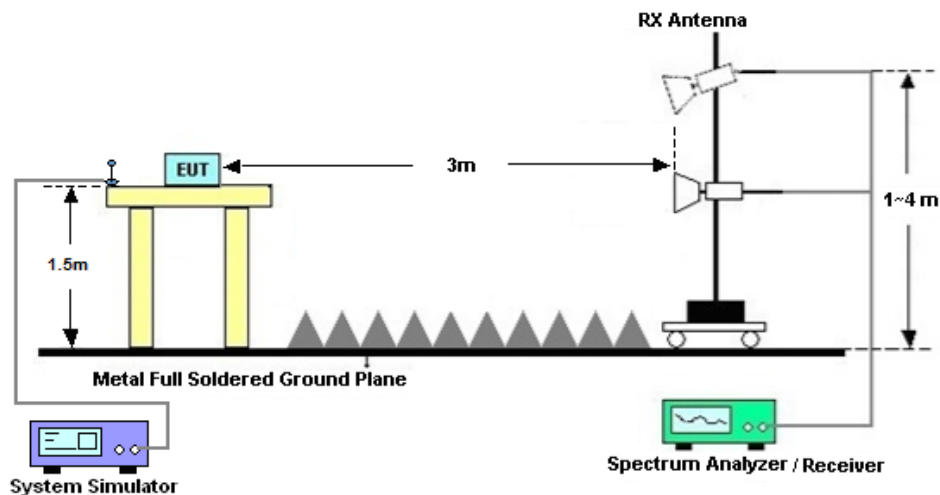
See list of measuring instruments of this test report.

4.2 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
$$\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$
$$\text{ERP (dBm)} = \text{EIRP} - 2.15$$
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is -40dBm/MHz

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Apr. 15, 2020	Mar. 12, 2021	Apr. 14, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jun. 08, 2020	Mar. 12, 2021	Jun. 07, 2021	Radiation (03CH04-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	1356	1GHz~18GHz	Apr. 20, 2020	Mar. 12, 2021	Apr. 19, 2021	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Jan. 06, 2021	Mar. 12, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 06, 2021	Mar. 12, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 07, 2021	Mar. 12, 2021	Jan. 06, 2022	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Mar. 12, 2021	Jan. 05, 2022	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5G Hz	Oct. 14, 2020	Mar. 12, 2021	Oct. 13, 2021	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 12, 2021	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 12, 2021	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 12, 2021	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.3dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.8dB
---	-------

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.8dB
---	-------

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)and EIRP

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP (W)		
Channel				55340	55990	56640			
Frequency (MHz)				3560	3625	3690	L	M	H
20	QPSK	100	0	21.65	21.25	21.44	14.6218	13.3352	13.9316
20	16QAM	100	0	21.25	21.24	21.41	13.3352	13.3045	13.8357
20	64QAM	100	0	20.01	21.16	20.16	10.0231	13.0617	10.3753
Channel				55315	55990	56665	EIRP		
Frequency (MHz)				3557.5	3625	3692.5	L	M	H
15	QPSK	75	0	21.44	22.11	21.22	13.9316	16.2555	13.2434
15	16QAM	75	0	20.84	21.32	20.05	12.1339	13.5519	10.1158
Channel				55290	55990	56690	EIRP		
Frequency (MHz)				3555	3625	3695	L	M	H
10	QPSK	50	0	20.85	21.06	21.28	12.1619	12.7644	13.4276
10	16QAM	50	0	20.91	20.95	21.38	12.3310	12.4451	13.7404
Channel				55265	55990	56715	EIRP		
Frequency (MHz)				3552.5	3625	3697.5	L	M	H
5	QPSK	25	0	20.77	21.22	20.83	11.9399	13.2434	12.1060
5	16QAM	25	0	20.65	21.12	20.91	11.6145	12.9420	12.3310

Remark: EIRP = Conducted Power (data-reuse FG072303) + antenna gain (20dBi)

**EIRP Power Density****Full RB0**

Mode	LTE Band 48 : EIRP Power Density (dBm/10MHz)											
BW	5MHz		10MHz		15MHz		20MHz		5MHz	10MHz	15MHz	20MHz
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	64QAM	64QAM	64QAM	64QAM
Lowest CH	34.79	34.94	32.08	32.08	30.5	30.43	29.83	29.53	33.54	31.01	29.34	28.59
Middle CH	34.9	34.95	32.11	32.44	30.5	30.62	29.61	29.82	33.73	31.16	29.47	28.46
Highest CH	34.56	34.76	32.23	32.29	30.42	30.46	29.58	29.23	33.6	30.77	29.5	28.19
Limit	37dBm /MHz											
Result	Pass											

Remark: EIRP Power Density = Conducted PSD (data-reuse FG072303) + antenna gain (20dBi)

Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

LTE Band 48 / 20MHz / QPSK								
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Middle	7230	-58.72	-40	-18.72	-70.18	2.84	14.30	H
	10848	-57.19	-40	-17.19	-67.13	3.49	13.43	H
	14466	-50.58	-40	-10.58	-60.82	3.85	14.09	H
	7230	-55.01	-40	-15.01	-66.47	2.84	14.30	V
	10848	-55.33	-40	-15.33	-65.27	3.49	13.43	V
	14466	-44.91	-40	-4.91	-55.15	3.85	14.09	V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



Appendix D. Reference Report

Please refer to Sporton report number FG072303 which is issued separately.