FCC TEST REPORT

(PART 90)

Applicant:	DataRemote Incorporated
Address:	18001 Old Cutler Rd. Suite 600, Miami, FL 33157

Manufacturer or Supplier:	DataRemote Incorporated
Address:	18001 Old Cutler Rd. Suite 600, Miami, FL 33157
Product:	LTE Cellular Router
Brand Name:	DataRemote
Model Name:	CDS-9010
FCC ID:	2AJLF-CDS-9010
Date of tests:	Mar. 23, 2019 ~ Apr. 28, 2019

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 90, Subpart R** ☒ **ANSI/TIA/EIA-603- D**
☒ **FCC Part 2** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Alex	Luke Lu
Date: Apr. 30, 2019	Date: Apr. 30, 2019

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190322W001-9	Original release	Apr. 30, 2019

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 90 & Part 2			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 90.542(a)(7)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
2.1055 90.213 90.539	Frequency Stability	PASS	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	PASS	Meet the requirement of limit.
2.1051 90.543	Emission Masks	PASS	Meet the requirement of limit.
2.1051 90.543	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 90.543	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -21.68dB at 45.26MHz.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Maximum Peak Output Power	±1dB
Frequency Stability	±39.27Hz
Radiated emissions	±4.48dB
Conducted emissions	±2 dB
Occupied Channel Bandwidth	±21.7KHz
Emission Mask Measurements	±4.48dB

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

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 26,19	Feb. 25,20
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 26,19	Feb. 25,20
Bilog Antenna 1	ETS-LINDGREN	3143B	00161964	Feb. 26,19	Feb. 25,20
Bilog Antenna 2	ETS-LINDGREN	3143B	00161965	Feb. 26,19	Feb. 25,20
Horn Antenna 1	ETS-LINDGREN	3117	00168728	Feb. 26,19	Feb. 25,20
Horn Antenna 2	ETS-LINDGREN	3117	00168692	Nov. 30, 18	Nov. 29, 19
Loop antenna	Daze	ZN30900A	0708	Oct. 23,18	Oct. 22, 19
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Nov. 21, 18	Nov. 20, 19
Radio Communication Analyzer	ANRITSU	MT8820C	6201465426	Feb. 26,19	Feb. 25,20
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jul. 09,18	Jul. 08,19
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Jul. 09,18	Jul. 08,19
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	Feb. 26,19	Feb. 25,20
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jul. 09,18	Jul. 08,19
Power Meter	Anritsu	ML2495A	1506002	Feb. 26,19	Feb. 25,20
Power Sensor	Anritsu	MA2411B	1339352	Feb. 26,19	Feb. 25,20
Humid & Temp Programmable Tester	Juyi	ITH-120-45-CP-AR	IAA1504-001	Jul. 09,18	Jul. 08,19
MXG Analog Microvave Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 26,19	Feb. 25,20

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	LTE Cellular Router	
BRAND NAME	DataRemote	
MODEL NAME	CDS-9010	
POWER SUPPLY	12Vdc (adapter or host equipment) 7.3Vdc (Li-ion, battery)	
MODULATION TECHNOLOGY	**LTE**	QPSK, 16QAM
FREQUENCY RANGE	**LTE Band 14 (Channel Bandwidth: 5MHz)**	790.5MHz ~ 795.5 MHz
	LTE Band 14 (Channel Bandwidth: 10MHz)	793 MHz
EMISSION DESIGNATOR	**LTE Band 14 (Channel Bandwidth: 5MHz)**	QPSK: 4M47G7D
		16QAM: 4M47W7D
	LTE Band 14 (Channel Bandwidth: 10MHz)	QPSK: 8M92G7D
		16QAM: 8M89W7D
MAX. ERP POWER	**LTE Band 14 (Channel Bandwidth: 5MHz)**	31mW
	LTE Band 14 (Channel Bandwidth: 10MHz)	28mW
ANTENNA TYPE	Fixed External antenna with -1dBi gain	
HW VERSION	V1.1	
SW VERSION	V3.10	
I/O PORTS	Refer to user's manual	
DATA CABLE	N/A	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	SHENZHEN GONGJIN ELECTRONICS CO.,LTD Electronic Limited
MODEL:	S24B72-120A200-C4
INPUT:	AC 100-240V, 800mA
OUTPUT:	DC 12V, 2000mA

3. The EUT matched the following Ethernet Cable and Telephone Cables:

ETHERNET CABLE	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ45-8P8C
SIGNAL LINE:	1500±20mm

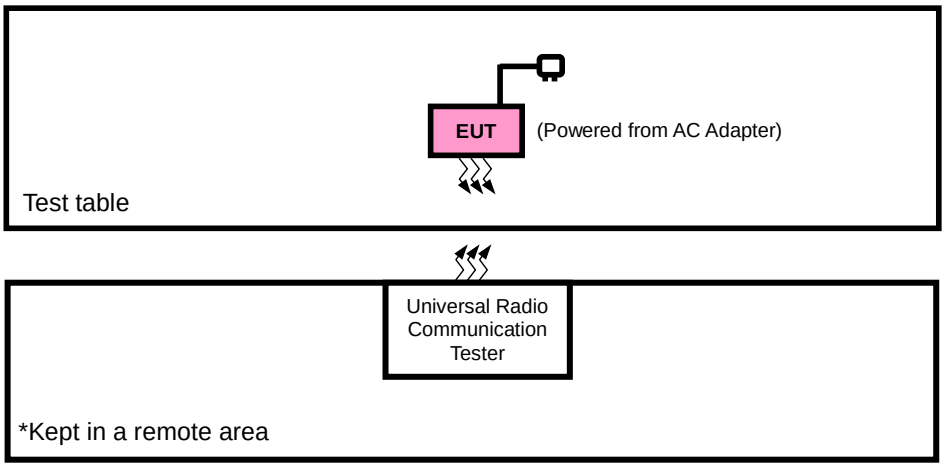
TELEPHONE CABLE 1	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ11-6P2C
SIGNAL LINE:	1500±20mm

TELEPHONE CABLE 2	
BRAND:	Shenzhen Eternity Ju Electronic Co., Ltd
MODEL:	RJ11-6P2C
SIGNAL LINE:	1500±20mm

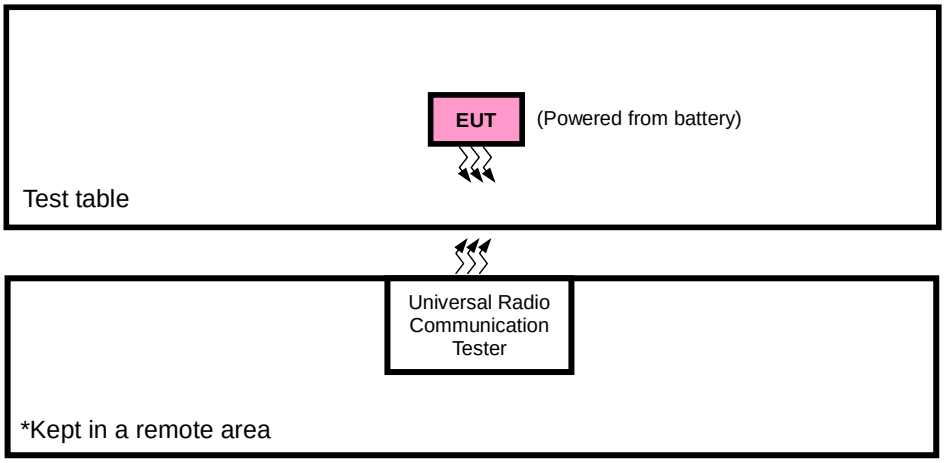
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR CONDUCTED & E.R.P./E.I.R.P TEST



2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

2.4 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports The worst case in ERP/EIRP and radiated emission was found when positioned on X-plane for LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter with LTE link**
B	EUT + Battery with **LTE link**

LTE BAND 14

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
B	ERP	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
B	FREQUENCY STABILITY	23305 to 23355	23305, 23355	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB Offset
B	OCCUPIED BANDWIDTH	23305 to 23355	23305, 23330, 23355	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
B	BAND EDGE	23305 to 23355	23305	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
			23330	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
			23355	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23330	23330	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
			23330	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
B	CONDCUDETED EMISSION	23305 to 23355	23305, 23330, 23355	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	23305 to 23355	23330	5MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP(ERP)	24deg. C, 60%RH	7.3Vdc from Battery	Star Le
FREQUENCY STABILITY	24deg. C, 61%RH	DC 7V/15V/16V	Rain Wang
OCCUPIED BANDWIDTH	24deg. C, 61%RH	7.3Vdc from Battery	Rain Wang
BAND EDGE	24deg. C, 61%RH	7.3Vdc from Battery	Rain Wang
CONDCUDETED EMISSION	24deg. C, 61%RH	7.3Vdc from Battery	Rain Wang
RADIATED EMISSION	23deg. C, 70%RH	DC 12V from adaptor	Star Le

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 90

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Per FCC Part 90.542(a)

Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.

3.1.2 TEST PROCEDURES

EIRP / ERP MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high operational frequency range). RBW and VBW is 10MHz for LTE.

b. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn

e. E.R.P = E.I.R.P- 2.15 dB

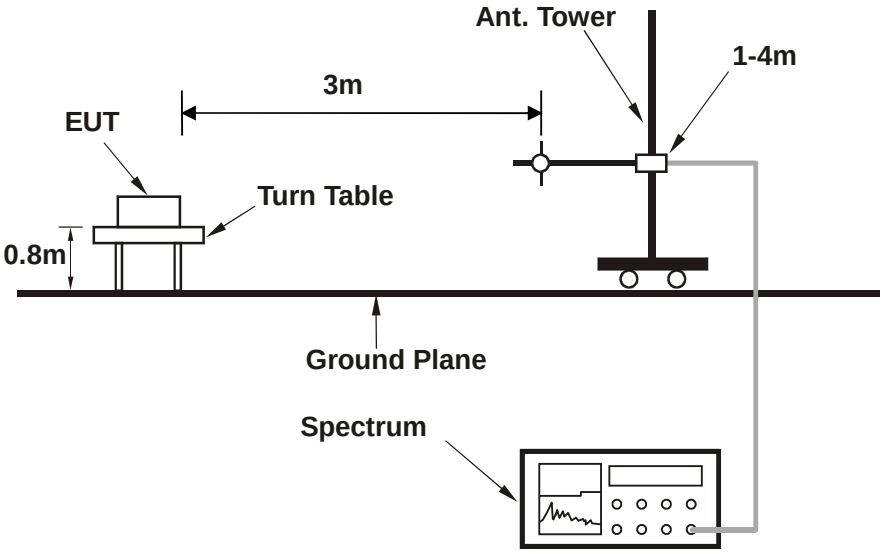
CONDUCTED POWER MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.

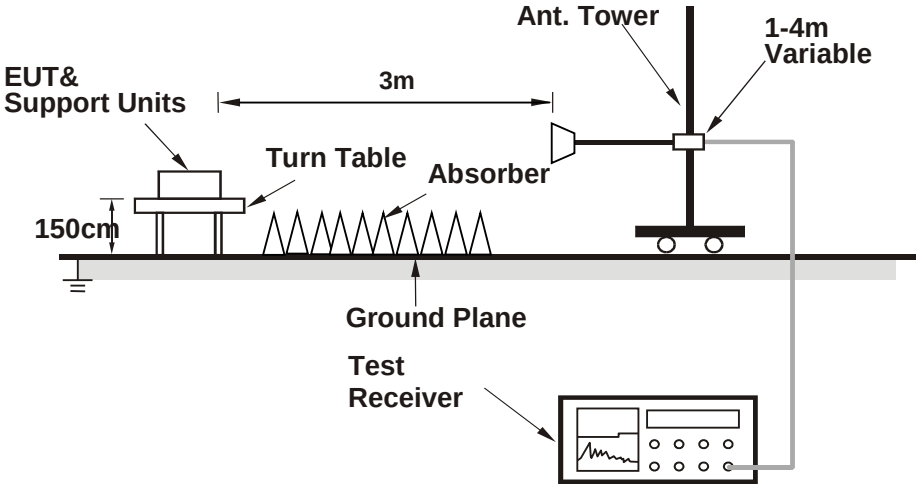
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

ERP MEASUREMENT:



EIRP MEASUREMENT:



For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.4 TEST RESULTS

AVERAGE CONDUCTED OUTPUT POWER (dBm)

LTE Band 14							
BW	**Modulation**	**RB Size**	**RB Offset**	**Low CH 23305**	**Mid CH 23330**	**High CH 23355**	**MPR**
				Frequency 790.5 MHz	**Frequency 793 MHz**	**Frequency 795.5 MHz**	
5 MHz	QPSK	1	0	23.05	23.53	23.07	0
		1	12	23.24	23.72	23.26	0
		1	24	23.11	23.59	23.13	0
		12	0	22.17	22.65	22.19	1
		12	6	22.22	22.70	22.24	1
		12	13	22.14	22.62	22.16	1
		25	0	22.20	22.68	22.22	1
	16QAM	1	0	21.91	22.39	21.93	1
		1	12	22.13	22.61	22.15	1
		1	24	22.04	22.52	22.06	1
		12	0	21.00	21.48	21.02	2
		12	6	21.24	21.72	21.26	2
		12	13	21.15	21.63	21.17	2
		25	0	21.18	21.66	21.20	2
BW	**Modulation**	**RB Size**	**RB Offset**	**CH**	**CH 23330**	**CH**	**MPR**
				Frequency MHz	**Frequency 793 MHz**	**Frequency MHz**	
10 MHz	QPSK	1	0	-	23.56	-	0
		1	24	-	**23.75**	-	0
		1	49	-	23.62	-	0
		25	0	-	22.68	-	1
		25	12	-	22.73	-	1
		25	25	-	22.65	-	1
		50	0	-	22.71	-	1
	16QAM	1	0	-	22.42	-	1
		1	24	-	22.64	-	1
		1	49	-	22.55	-	1
		25	0	-	21.51	-	2
		25	12	-	21.75	-	2
		25	25	-	21.66	-	2
		50	0	-	21.69	-	2

ERP

LTE BAND 14

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23305	790.5	-18.14	33.18	12.89	19.45	H	3
23330	793.0	-18.86	33.26	12.25	16.80	H	3
23355	795.5	-18.86	33.28	12.27	16.85	H	3
23305	790.5	-15.21	32.25	14.89	**30.85**	V	3
23330	793.0	-15.88	32.34	14.31	26.98	V	3
23355	795.5	-15.67	32.41	14.59	28.80	V	3

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23305	790.5	-19.00	33.18	12.03	15.96	H	3
23330	793.0	-19.73	33.26	11.38	13.75	H	3
23355	795.5	-19.71	33.28	11.42	13.85	H	3
23305	790.5	-16.07	32.25	14.03	25.31	V	3
23330	793.0	-16.75	32.34	13.44	22.08	V	3
23355	795.5	-16.52	32.41	13.74	23.68	V	3

LTE BAND 14

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23330	793.0	-18.86	33.26	12.25	16.80	H	30
23330	793.0	-15.78	32.34	14.41	**27.59**	V	30

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	SPA LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
23330	793.0	-19.93	33.26	11.18	13.13	H	30
23330	793.0	-16.85	32.34	13.34	21.57	V	30

REMARKS: 1. ERP Output Power (dBm) = SPA LVL (dBm) + Correction Factor (dB) -2.15(dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked

3.2.2 TEST PROCEDURE

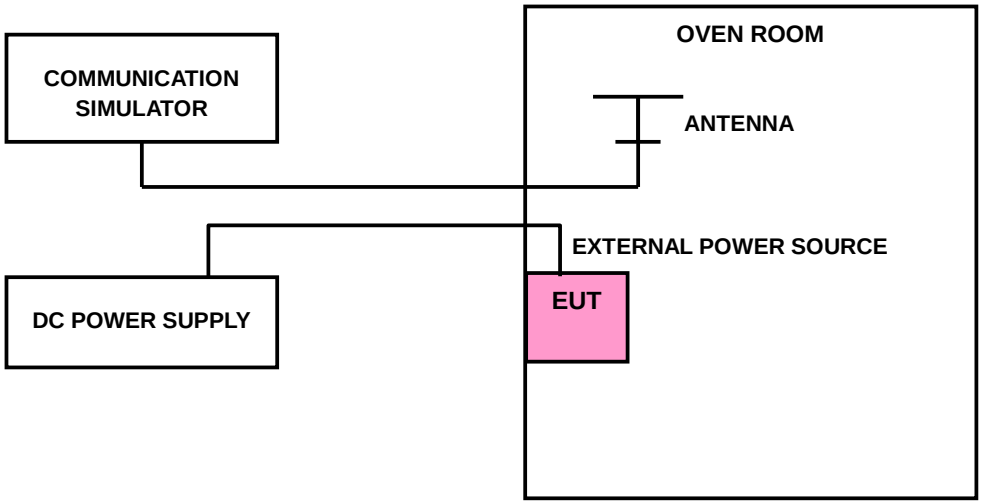
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

LTE BAND 14

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
15	0.0020	0.0019	2.5
7	-0.0026	-0.0024	2.5
16	0.0019	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 7Vdc to 16Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

TEMP. (℃)	5MHz		LIMIT (ppm)
	FREQUENCY ERROR (ppm)		
	Low Channel	High Channel	
-30	-0.0146	-0.0145	2.5
-20	-0.0132	-0.0130	2.5
-10	-0.0119	-0.0117	2.5
0	-0.0096	-0.0093	2.5
10	-0.0073	-0.0070	2.5
20	-0.0061	-0.0059	2.5
30	-0.0049	-0.0046	2.5
40	-0.0027	-0.0024	2.5
50	-0.0010	-0.0007	2.5

FREQUENCY ERROR VS. VOLTAGE

VOLTAGE (Volts)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23330	
15	0.0025	2.5
7	-0.0026	2.5
16	0.0021	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 7Vdc to 16Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

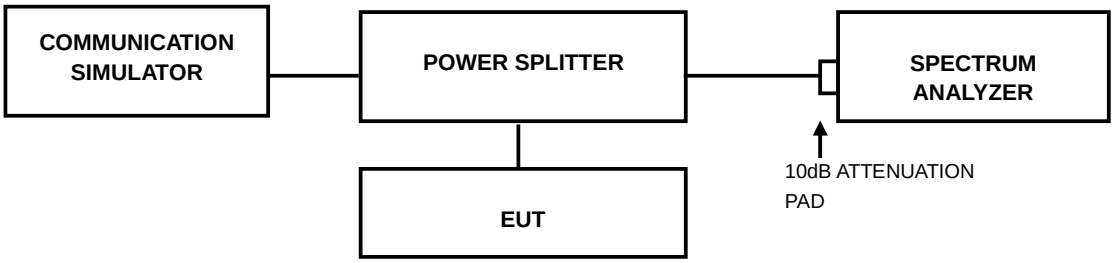
TEMP. (℃)	10MHz	LIMIT (ppm)
	FREQUENCY ERROR (ppm)	
	Channel 23330	
-30	-0.0152	2.5
-20	-0.0138	2.5
-10	-0.0114	2.5
0	-0.0085	2.5
10	-0.0069	2.5
20	-0.0049	2.5
30	-0.0028	2.5
40	-0.0013	2.5
50	0.0006	2.5

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

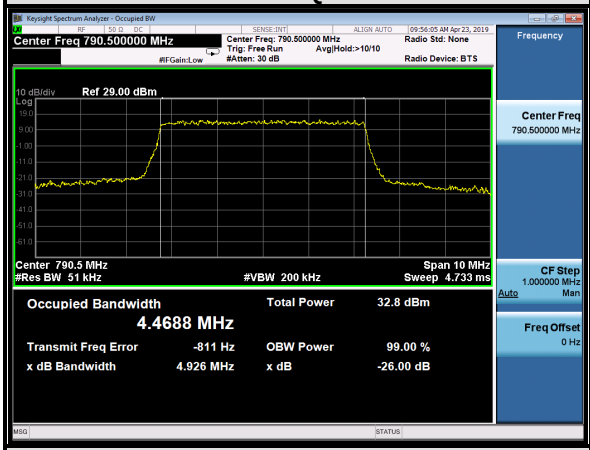
3.3.4 TEST RESULTS

LTE BAND 14

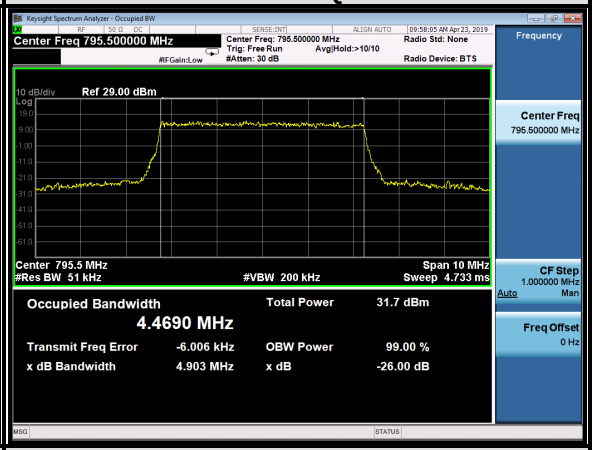
CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
23305	790.5	4.47	4.47	-	-	-	-
23330	793	4.47	4.47	23330	793	8.92	8.89
23355	795.5	4.47	4.47	-	-	-	-

SPECTRUM PLOT OF WORST VALUE

5MHz / QPSK



5MHz / 16QAM



10MHz / QPSK

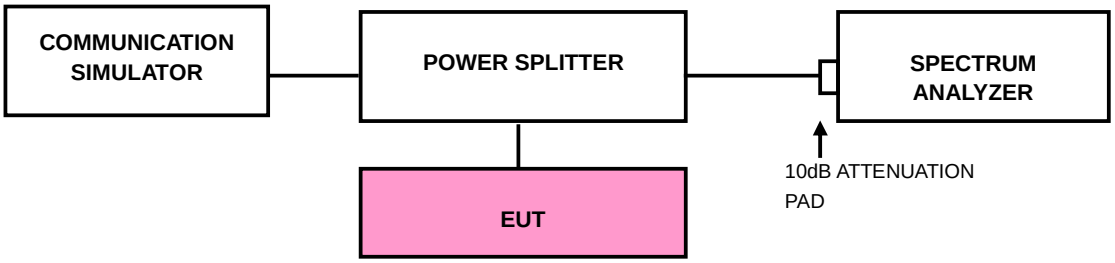
10MHz / 16QAM

3.4 EMISSION MASK MEASUREMENT

3.4.1 LIMITS OF EMISSION MASK MEASUREMENT

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).

b. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

c. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 50kHz and VBW of the spectrum is 200kHz. (LTE bandwidth 5MHz)

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz. (LTE bandwidth 10MHz)

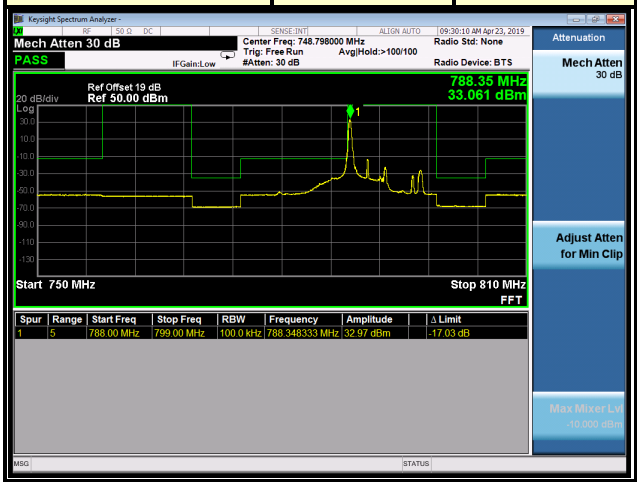
e. Record the max trace plot into the test report.

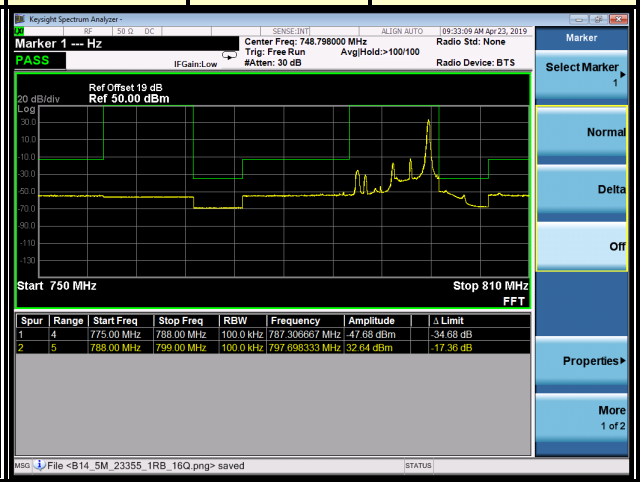
3.4.4 TEST RESULTS

LTE BAND 14

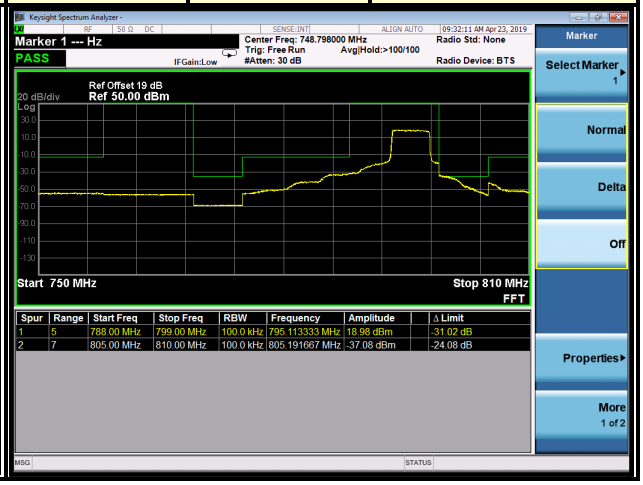
Channel Bandwidth: 5MHz / QPSK

CHANNEL	23305	1 RB	CHANNEL	23355	1 RB





CHANNEL	23305	Full RB	CHANNEL	23355	Full RB



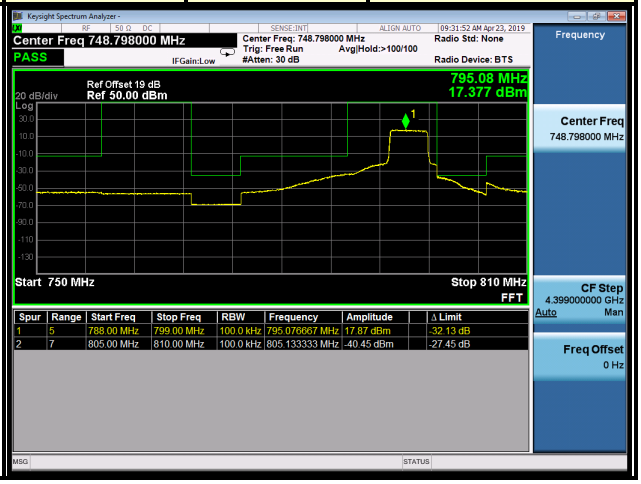
Channel Bandwidth: 5MHz / 16QAM

CHANNEL	23305	1 RB

CHANNEL	23355	1 RB

CHANNEL	23305	Full RB

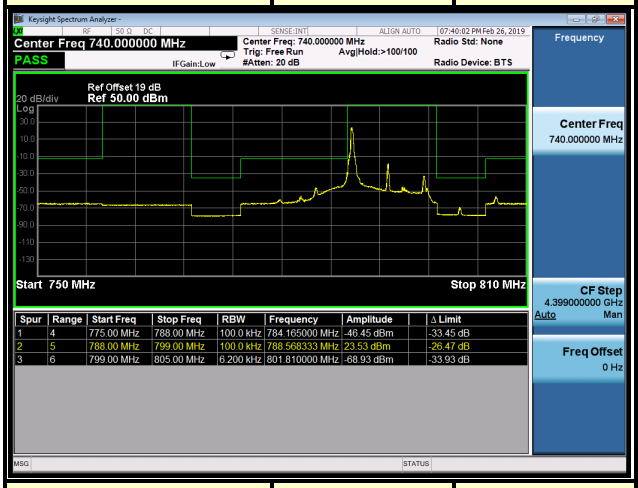
CHANNEL	23355	Full RB



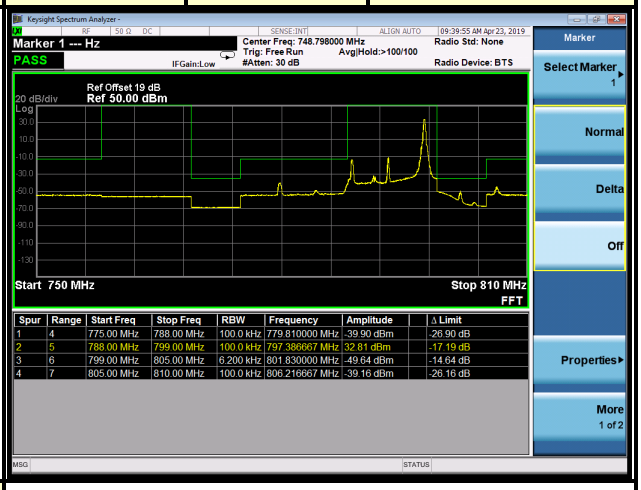
LTE BAND 14

Channel Bandwidth: 10MHz / QPSK

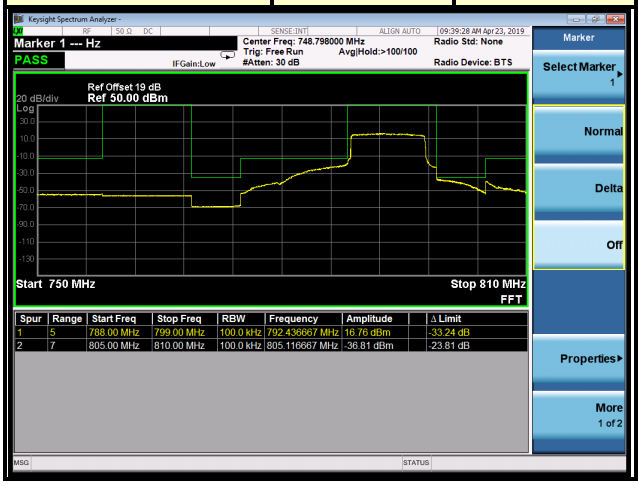
CHANNEL	23330	1 RB



CHANNEL	23330	1 RB

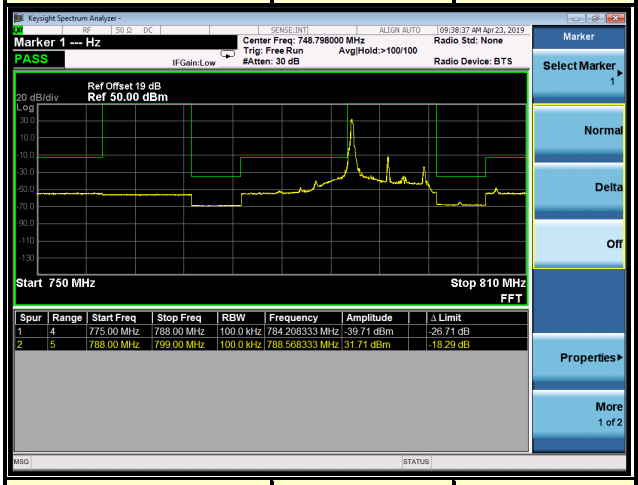


CHANNEL	23330	Full RB



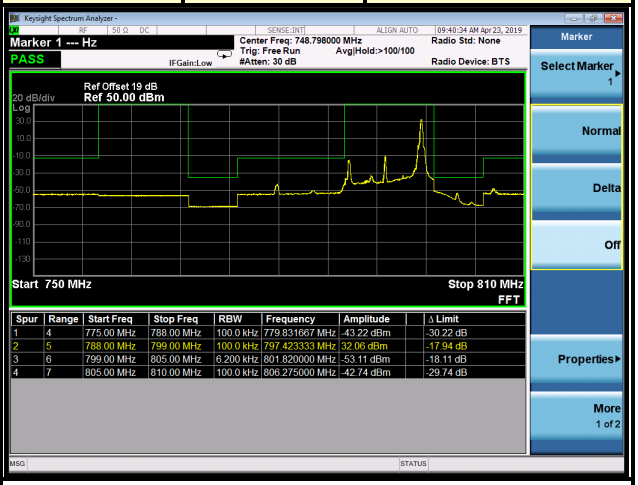
Channel Bandwidth: 10MHz / 16QAM

CHANNEL	23330	1 RB



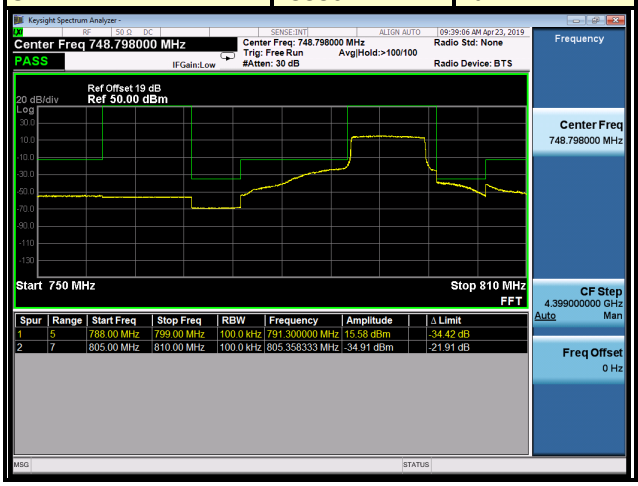
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	4	775.00 MHz	788.00 MHz	100.0 kHz	784.208333 MHz	-39.71 dBm	-26.71 dB
2	5	788.00 MHz	799.00 MHz	100.0 kHz	788.568333 MHz	31.71 dBm	-18.29 dB

CHANNEL	23330	1 RB



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	4	775.00 MHz	788.00 MHz	100.0 kHz	779.831667 MHz	-43.22 dBm	-30.22 dB
2	5	788.00 MHz	799.00 MHz	100.0 kHz	797.423333 MHz	32.06 dBm	-17.94 dB
3	6	799.00 MHz	805.00 MHz	6.200 kHz	801.820000 MHz	-53.11 dBm	-18.11 dB
4	7	805.00 MHz	810.00 MHz	100.0 kHz	806.275000 MHz	-42.74 dBm	-29.74 dB

CHANNEL	23330	Full RB



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	5	788.00 MHz	799.00 MHz	100.0 kHz	791.300000 MHz	15.58 dBm	-34.42 dB
2	7	805.00 MHz	810.00 MHz	100.0 kHz	805.358333 MHz	-34.91 dBm	-21.91 dB

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

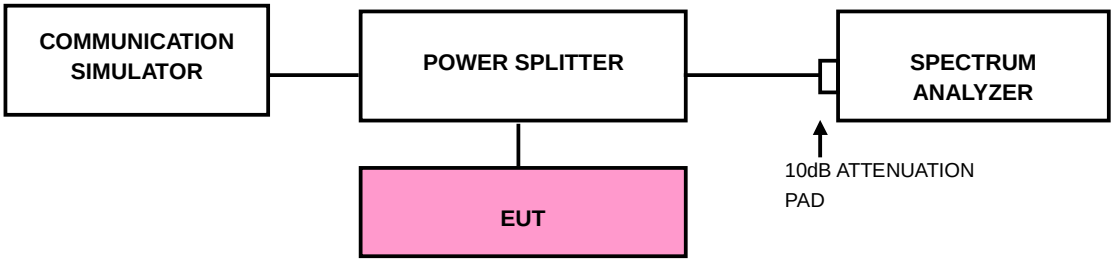
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

3.5.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at middle operational frequency range.

b. Measuring frequency range is from 30 MHz to 9GHz for LTE Band 14. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

3.5.3 TEST SETUP



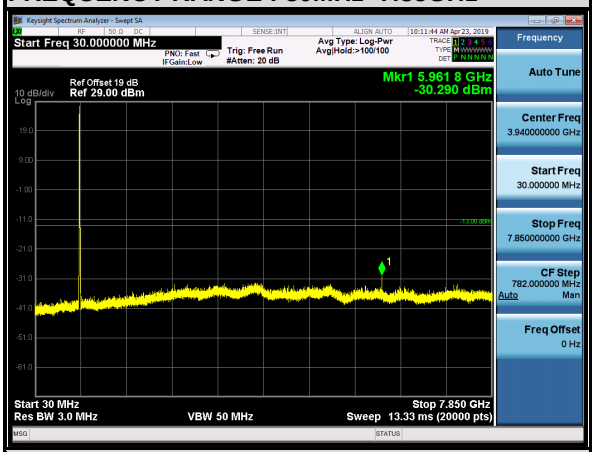
3.5.4 TEST RESULTS

LTE Band 14

5MHz / QPSK

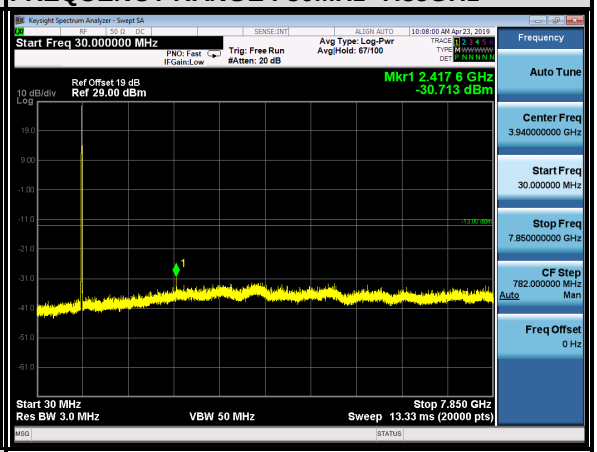
CHANNEL 23305

FREQUENCY RANGE : 30MHz~7.85GHz



CHANNEL 23330

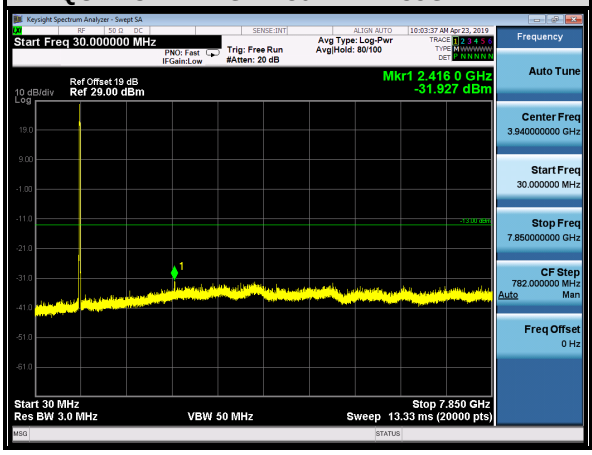
FREQUENCY RANGE : 30MHz~7.85GHz



CHANNEL 23355

FREQUENCY RANGE : 30MHz~7.85GHz

10MHz / QPSK	
CHANNEL 23330	
FREQUENCY RANGE : 30MHz~7.85GHz	



3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

(1)The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

(2) For operations in the 763–775 MHz and 793–805 MHz bands, all emissions including harmonics in the band 1559– 1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

3.6.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

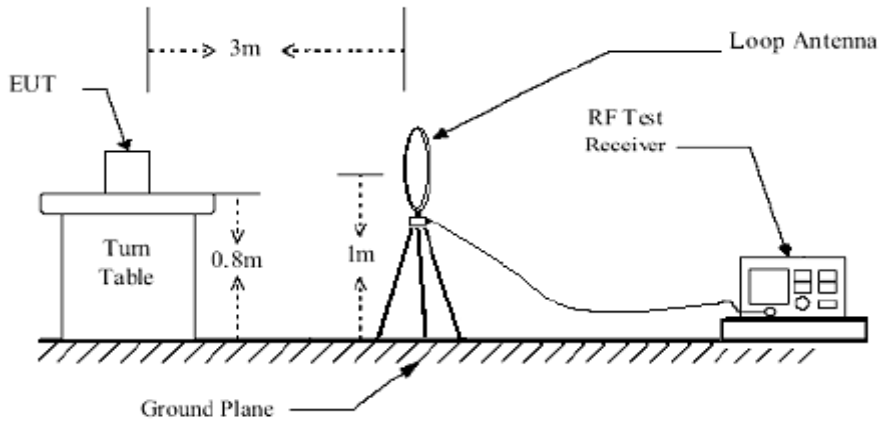
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

3.6.3 DEVIATION FROM TEST STANDARD

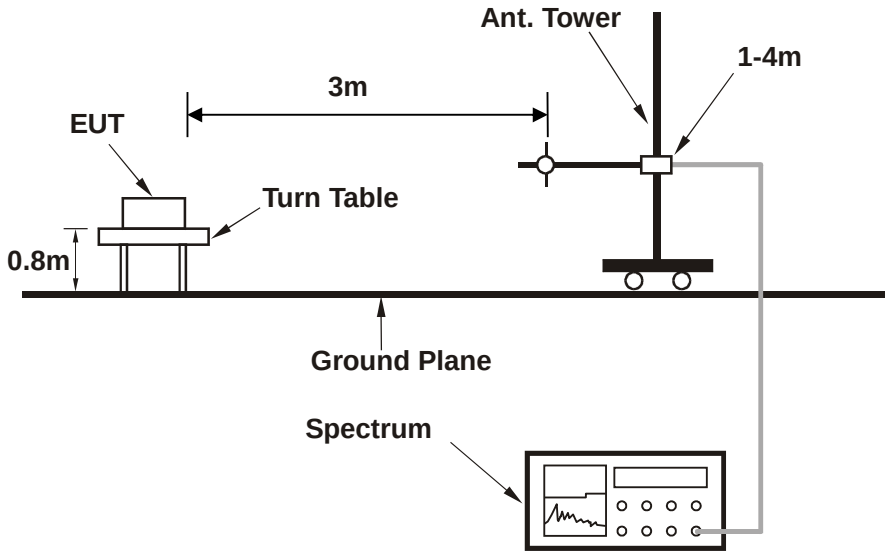
No deviation

3.6.4 TEST SETUP

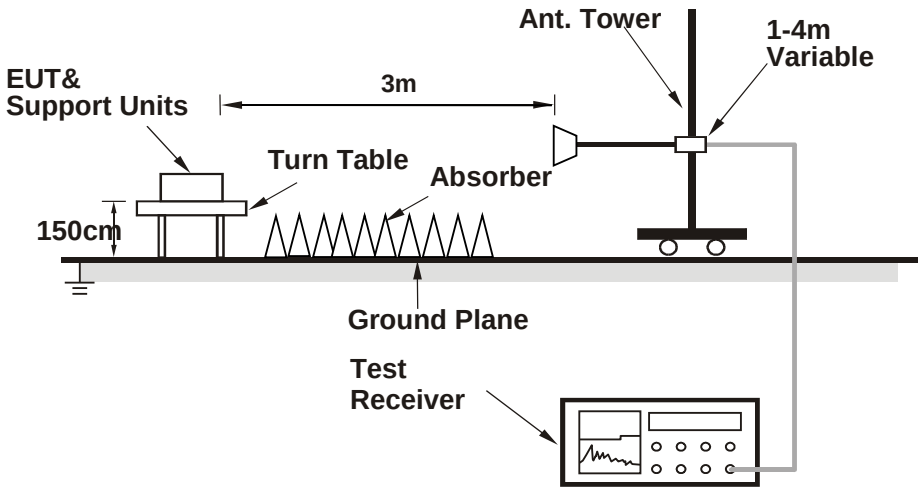
<Below 30MHz>



< Frequency Range 30MHz~1GHz >



< Frequency Range above 1GHz >



For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

9 KHz – 30 MHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

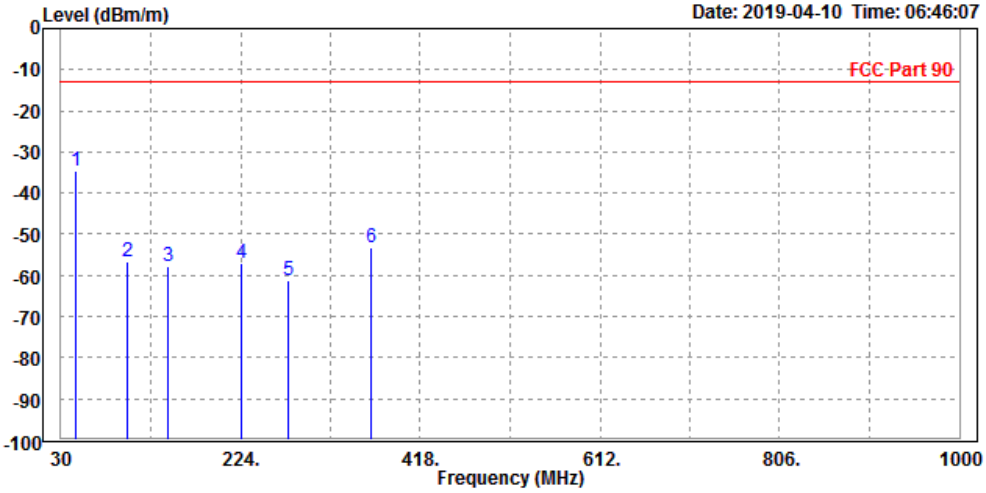
30 MHz – 1GHz data:

LTE Band 14:

CHANNEL BANDWIDTH: 10MHz / QPSK

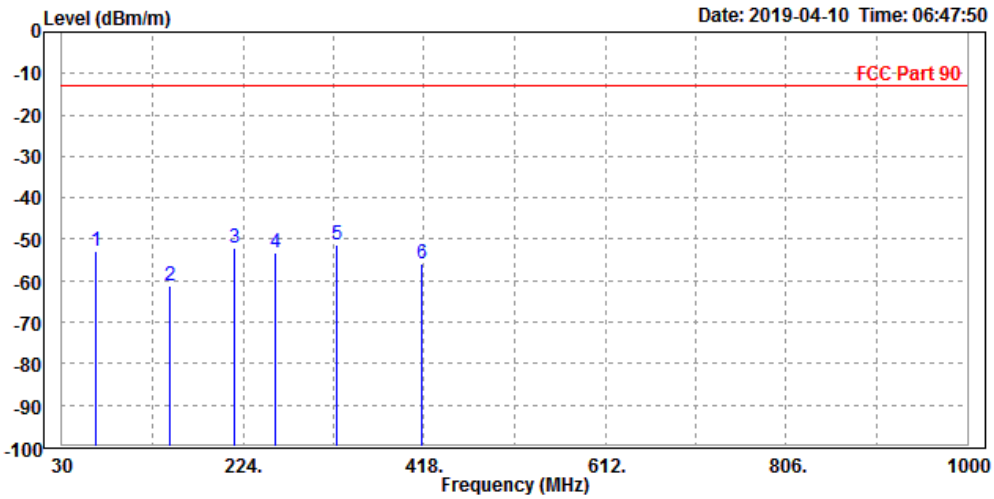
MODE	TX channel 23330	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	PP	45.260	-34.68	-42.15	-13.00	-21.68	7.47	Peak	Horizontal
2		101.230	-56.77	-45.36	-13.00	-43.77	-11.41	Peak	Horizontal
3		145.690	-57.78	-38.61	-13.00	-44.78	-19.17	Peak	Horizontal
4		225.340	-56.90	-40.15	-13.00	-43.90	-16.75	Peak	Horizontal
5		275.480	-61.37	-46.35	-13.00	-48.37	-15.02	Peak	Horizontal
6		365.620	-53.09	-41.48	-13.00	-40.09	-11.61	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1	66.210	-52.88	-38.52	-13.00	-39.88	-14.36	Peak	Vertical
2	145.720	-61.28	-45.31	-13.00	-48.28	-15.97	Peak	Vertical
3	215.420	-52.23	-41.32	-13.00	-39.23	-10.91	Peak	Vertical
4	258.410	-53.04	-41.56	-13.00	-40.04	-11.48	Peak	Vertical
5 PP	325.160	-51.46	-40.26	-13.00	-38.46	-11.20	Peak	Vertical
6	415.580	-55.97	-45.61	-13.00	-42.97	-10.36	Peak	Vertical



ABOVE 1GHz

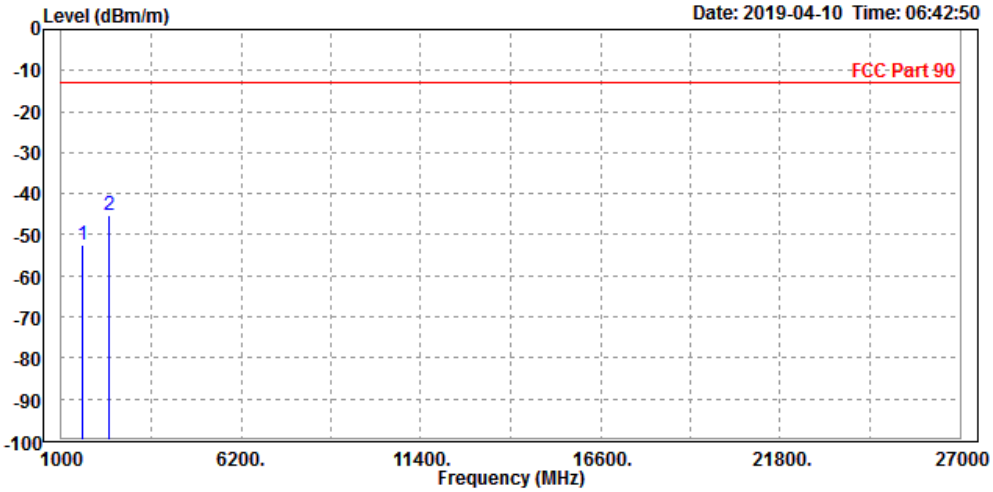
Note: For higher frequency, the emission is too low to be detected.

LTE BAND 14

CHANNEL BANDWIDTH: 5MHz / QPSK

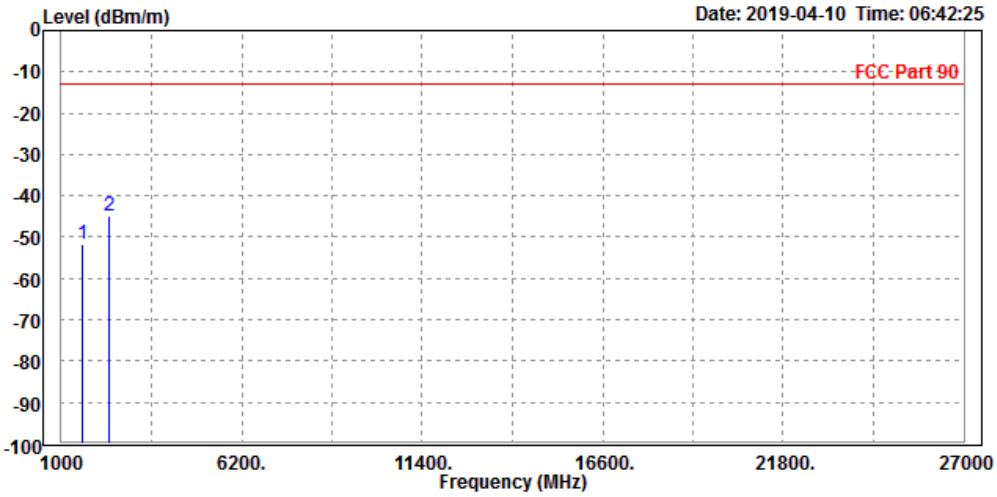
MODE	TX channel 23330	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1598.000	-52.50	-47.12	-13.00	-39.50	-5.38	Peak	Horizontal
2	PP	2379.000	-45.09	-43.36	-13.00	-32.09	-1.73	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

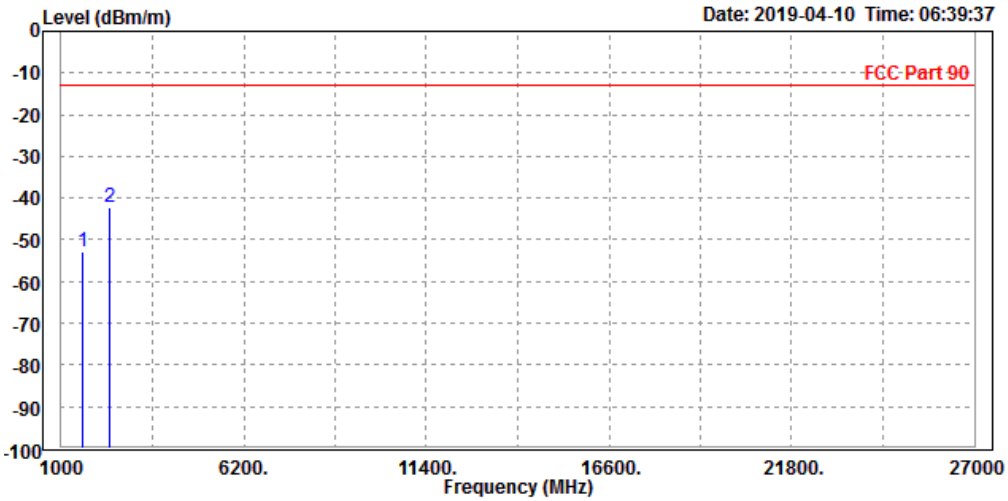
		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1598.000	-51.89	-47.87	-13.00	-38.89	-4.02	Peak	Vertical
2	PP	2379.000	-44.76	-44.57	-13.00	-31.76	-0.19	Peak	Vertical



CHANNEL BANDWIDTH: 10MHz / QPSK

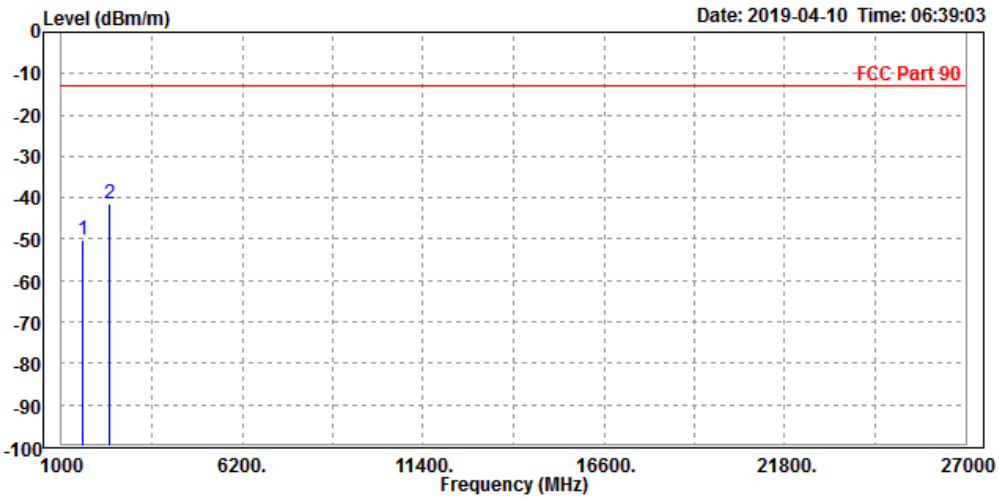
MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1598.000	-52.69	-47.31	-13.00	-39.69	-5.38	Peak	Horizontal
2	PP	2379.000	-42.38	-40.65	-13.00	-29.38	-1.73	Peak	Horizontal



MODE	TX channel 23330	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	DC 12V from adapter
TESTED BY	Star Le		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBm/m	dBm	dBm/m	dB	dB/m		
1		1598.000	-50.16	-46.14	-13.00	-37.16	-4.02	Peak	Vertical
2	PP	2379.000	-41.41	-41.22	-13.00	-28.41	-0.19	Peak	Vertical



4 INFORMATION ON THE TESTING LABORATORIES

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Shenzhen EMC/RF Lab:
Tel: +86-755-88696566
Fax: +86-755-88696577

Email: customerservice.dg@cn.bureauveritas.com
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---