

# **TEST REPORT**

No. I21N02089-BLE

for

### **TCL Communication Ltd**

### **MOVEAUDIO S180 TRUE WIRELESS IN-EAR NC HEADPHONES**

**Model Name: TW18** 

with

Hardware Version: TW18\_V1.1

Software Version: TW18\_buds\_1.0.0.5

FCC ID: 2ACCJB163

Issued Date: 2021-08-11

Designation Number: CN1210 ISED Assigned Code: 23289

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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# 1. Summary of Test Report

### 1.1. Test Items

Description MOVEAUDIO S180 TRUE WIRELESS IN-EAR NC HEADPHONES

Model Name TW18

Applicant's name TCL Communication Ltd

Manufacturer's Name TCL Communication Ltd

### 1.2. Test Standards

FCC Part15-2019; ANSI C63.10-2013;

### 1.3. Test Result

**Pass** 

### 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

### 1.5. Project data

Testing Start Date: 2021-07-10
Testing End Date: 2021-07-30

### 1.6. Signature

An Ran

(Prepared this test report)

Tang Weisheng

(Reviewed this test report)

Zhang Bojun

(Approved this test report)



# 2. Client Information

### 2.1. Applicant Information

Company Name: TCL Communication Ltd

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Park Shatin, NT, Hong Kong

Contact Person Gong Zhizhou

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### 2.2. Manufacturer Information

Company Name: TCL Communication Ltd

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Park Shatin, NT, Hong Kong

Contact Person Gong Zhizhou

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# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

### 3.1. About EUT

Description MOVEAUDIO S180 TRUE WIRELESS IN-EAR NC

**HEADPHONES** 

Model Name TW18

Frequency Range 2400MHz~2483.5MHz

Type of Modulation GFSK Number of Channels 40

Antenna Type Integrated
Antenna Gain 0.19dBi

Power Supply 3.7V DC by Battery

FCC ID 2ACCJB163

Condition of EUT as received No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

### 3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	<b>HW Version</b>	SW Version	Receive Date
UT03aa	/	TW18_V1.1	TW18_buds_1.0.0.5	2021-07-05
UT01aa	/	TW18_V1.1	TW18_buds_1.0.0.5	2021-07-05

<sup>\*</sup>EUT ID: is used to identify the test sample in the lab internally.

### 3.3. Internal Identification of AE used during the test

AE ID*	Description	AE ID*
AE1	Battery	/

<sup>\*</sup>AE ID: is used to identify the test sample in the lab internally.

#### 3.4. General Description

The Equipment under Test (EUT) is a model of MOVEAUDIO S180 TRUE WIRELESS IN-EAR NC HEADPHONES (the left headphone) with integrated antenna and battery.

It consists of normal options: Charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



# 4. Reference Documents

## 4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### 4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15	FCC CFR 47, Part 15, Subpart C:	2019
	15.205 Restricted bands of operation;	
	15.209 Radiated emission limits, general requirements;	
	15.247 Operation within the bands 902–928MHz,	
	2400–2483.5 MHz, and 5725–5850 MHz	
ANSI C63.10	American National Standard of Procedures for Compliance	2013
	Testing of Unlicensed Wireless Devices	



# 5. Test Results

### 5.1. <u>Testing Environment</u>

Normal Temperature: 15~35°C Relative Humidity: 20~75%

### 5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Sub-clause of IC	Verdict
0	Antenna Requirement	15.203	/	Р
1	Maximum Peak Output Power	15.247 (b)	RSS-247 section 5.4	Р
2	Peak Power Spectral Density	15.247 (e)	RSS-247 section 5.2	Р
3	6dB Bandwidth	15.247 (a)	RSS-247 section 5.2	Р
4	Band Edges Compliance	15.247 (d)	RSS-247 section 5.5	Р
5	Transmitter Spurious	15 047 (d)	RSS-247 section 5.5/	Р
5	Emission - Conducted	15.247 (d)	RSS-Gen section 6.13	F
6	Transmitter Spurious	15.247, 15.205, 15.209	RSS-247 section 5.5/	P
0	Emission - Radiated	15.247, 15.205, 15.209	RSS-Gen section 6.13	F
7	AC Power line Conducted	15.107, 15.207	RSS-Gen section 8.8	NA
	Emission	15.107, 15.207	KSS-Gen Section 6.6	INA

See **ANNEX** A for details.

**NA**: Because the device can not use Bluetooth function when charging, the conducted continuous disturbance test is not required.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.



# 6. Test Equipments Utilized

### **Conducted test system**

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibratio n Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2021-12-30	1 year

Radiated emission test system

NO.	Equipment	Model	Serial	Manufacturer	Calibration	Calibration	
		wiodei	Number	wanuracturer	Due date	Period	
1	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 years	
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2024-05-27	3 years	
3	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 years	
4	Test Receiver	ESR7	101676	Rohde & Schwarz	2021-11-25	1 year	
5	Spectrum	FSV40	101192	Rohde & Schwarz	2022-01-13	1 400	
5	Analyser	F3V40	101192	Ronde & Schwarz	2022-01-13	1 year	
6	Chamber	FACT3-2.0	1285	ETS-Lindgren	2023-05-29	2 years	
7	Antenna	QSH-SL-18-	17012	47040	Oner	2022 04 06	2
		26-S-20	17013	Q-par	2023-01-06	3 years	

### **Test software**

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	8.53.0
3	EMC32	Rohde & Schwarz	10.01.00

EUT is engineering software provided by the customer to control the transmitting signal.

The EUT was programmed to be in continuously transmitting mode.

### **Anechoic chamber**

Fully anechoic chamber by ETS-Lindgren



# 7. <u>Laboratory Environment</u>

### Semi-anechoic chambe

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz

### Shielded room

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4Ω

## Fully-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2M Ω
Ground system resistance	< 4Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz



# 8. Measurement Uncertainty

Test Name	Uncertain	aty ( <i>k</i> =2)
RF Output Power - Conducted	1.32	dB
2.Power Spectral Density - Conducted	2.32	dB
3.Occupied channel bandwidth - Conducted	66H	łz
	30MHz≤f≤1GHz	1.41dB
4 Transmitter Spurious Emission Conducted	1GHz≤f≤7GHz	1.92dB
4 Transmitter Spurious Emission - Conducted	7GHz≤f≤13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
	9kHz≤f≤30MHz	1.74dB
5 Transmitter Courieus Emission Dedicted	30MHz≤f≤1GHz	4.84dB
5. Transmitter Spurious Emission - Radiated	1GHz≤f≤18GHz	4.68dB
	18GHz≤f≤40GHz	3.76dB
6. AC Power line Conducted Emission	150kHz≤f≤30MHz	3.00dB



## **ANNEX A: Detailed Test Results**

### **Test Configuration**

The measurement is made according to ANSI C63.10.

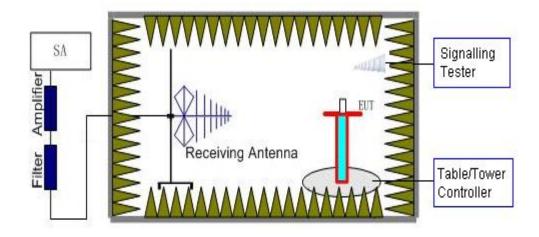
### 1) Conducted Measurements

- 1. Connect the EUT to the test system correctly.
- 2. Set the EUT to the required work mode.
- 3. Set the EUT to the required channel.
- 4. Set the spectrum analyzer to start measurement.
- 5. Record the values.



#### 2) Radiated Measurements

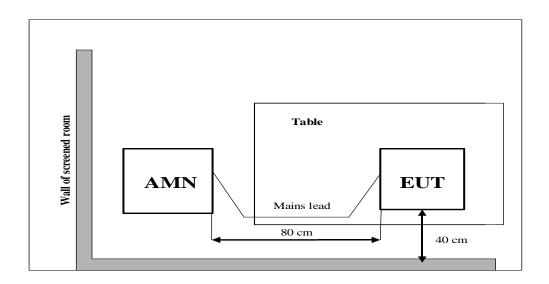
**Test setup:** EUT was placed on a 1.5 meter high non-conductive table at a 3 meter test distance from the receive antenna. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiving antenna polarization.





### 3) AC Power line Conducted Emission Measurement

For Bluetooth LE, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.





# A.0 Antenna requirement

### **Measurement Limit:**

Standard	Requirement
	An intentional radiator shall be designed to ensure that no antenna other than that
	furnished by the responsible party shall be used with the device. The use of a
	permanently attached antenna or of an antenna that uses a unique coupling to the
	intentional radiator shall be considered sufficient to comply with the provisions of
	this section. The manufacturer may design the unit so that a broken antenna can
	be replaced by the user, but the use of a standard antenna jack or electrical
FCC CRF Part	connector is prohibited. This requirement does not apply to carrier current devices
15.203	or to devices operated under the provisions of §15.211, §15.213, §15.217,
	§15.219, or §15.221. Further, this requirement does not apply to intentional
	radiators that must be professionally installed, such as perimeter protection
	systems and some field disturbance sensors, or to other intentional radiators
	which, in accordance with §15.31(d), must be measured at the installation site.
	However, the installer shall be responsible for ensuring that the proper antenna is
	employed so that the limits in this part are not exceeded.

Conclusion: The Directional gains of antenna used for transmitting is 0.19 dBi.

The RF transmitter uses an integrate antenna without connector.



# A.1 Maximum Peak Output Power

Method of Measurement: See ANSI C63.10-clause 11.9.1.1

Use the following spectrum analyzer settings:

- a) Set the RBW = 1 MHz.
- b) Set VBW = 3 MHz.
- c) Set span = 3 MHz.
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

#### **Measurement Limit:**

Standard	Limit (dBm)	E.I.R.P Limit (dBm)
FCC 47 CRF Part 15.247(b)	120	1 26
& RSS-247 section 5.4	< 30	< 36

#### **Measurement Results:**

Mode	Frequency (MHz)	Peak Conducted Output Power (dBm)	E.I.R.P (dBm)	Conclusion
	2402(CH0)	4.35	4.54	Р
LE 1M	2440(CH19)	3.97	4.16	Р
	2480(CH39)	3.18	3.37	Р

**Conclusion: Pass** 



## A.2 Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-clause 11.10.2

#### **Measurement Limit:**

Standard	Limit
FCC 47 CRF Part 15.247(e) &	< 8 dBm/3 kHz
RSS-247 section 5.2	< 6 UDITI/3 KMZ

#### **Measurement Results:**

Mode	Frequency (MHz)	Peak Power Spectral Density (dBm)		Conclusion
	2402(CH0)	Fig.1	-10.61	Р
LE 1M	2440(CH19)	Fig.2	-10.94	Р
	2480(CH39)	Fig.3	-11.94	Р

See below for test graphs.

**Conclusion: PASS** 

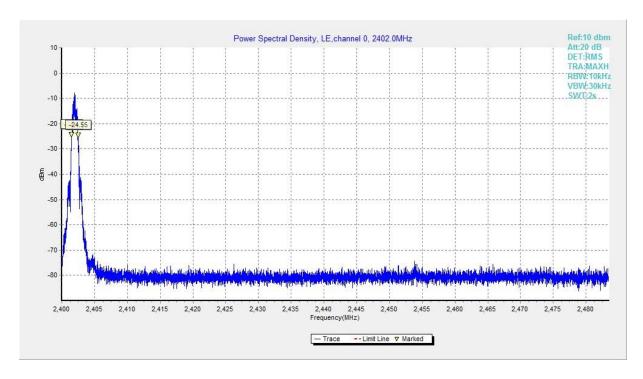


Fig.1 Power Spectral Density (Ch 0), LE 1M



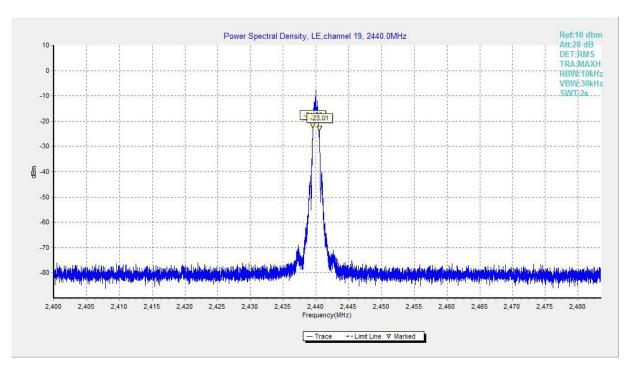


Fig.2 Power Spectral Density (Ch 19), LE 1M

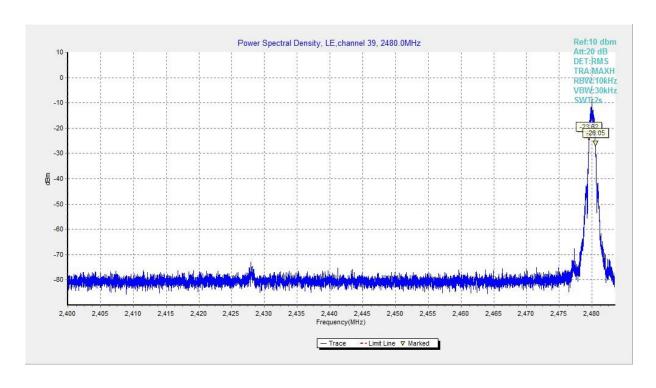


Fig.3 Power Spectral Density (Ch 39), LE 1M



### A.3 6dB Bandwidth

#### **Measurement Limit:**

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a) &	> 500
RSS-247 section 5.2	≥ 500

### **Measurement Result:**

Mode	Frequency (MHz)	Test Resi	ults ( kHz)	Conclusion
	2402(CH0)	Fig.4	686.00	Р
LE 1M	2440(CH19)	Fig.5	692.00	Р
	2480(CH39)	Fig.6	701.00	Р

See below for test graphs.

**Conclusion: PASS** 

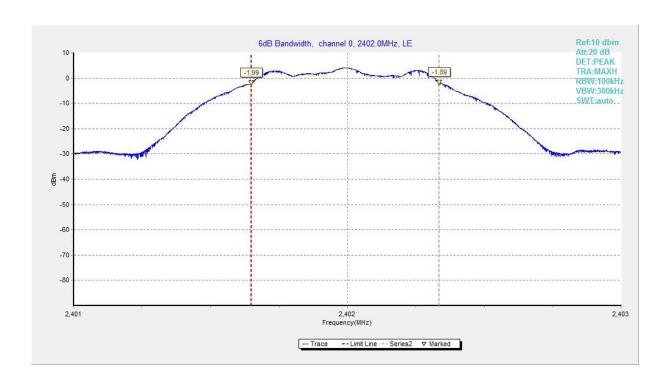


Fig.4 6dB Bandwidth (Ch 0), LE 1M



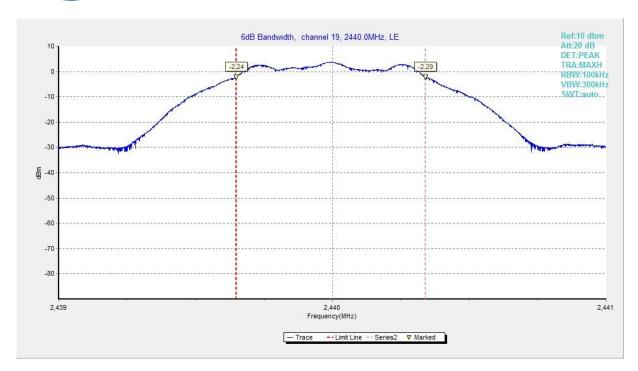


Fig.5 6dB Bandwidth (Ch 19), LE 1M

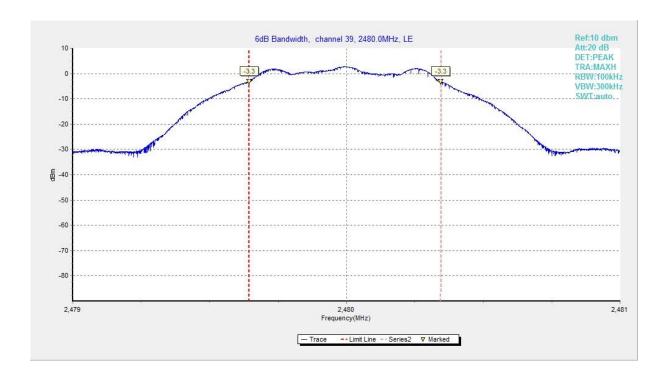


Fig.6 6dB Bandwidth (Ch 39), LE 1M



# A.4 Band Edges Compliance

### **Measurement Limit:**

Standard	Limit (dB)
FCC 47 CFR Part 15.247 (d) &	. 20
RSS-247 section 5.5	> 20

### **Measurement Result:**

Mode	Frequency (MHz)	Test Resu	Its (dBc)	Conclusion
LE 1M	2402(CH0)	Fig.7	-56.68	Р
LE IIVI	2480(CH39)	Fig.8	-60.42	Р

See below for test graphs.

**Conclusion: PASS** 



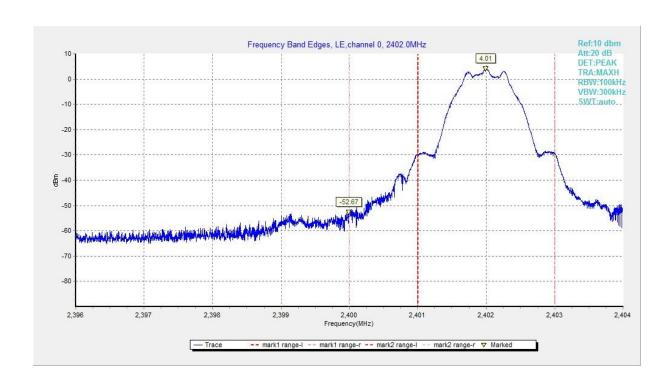


Fig.7 Band Edges (Ch 0), LE 1M

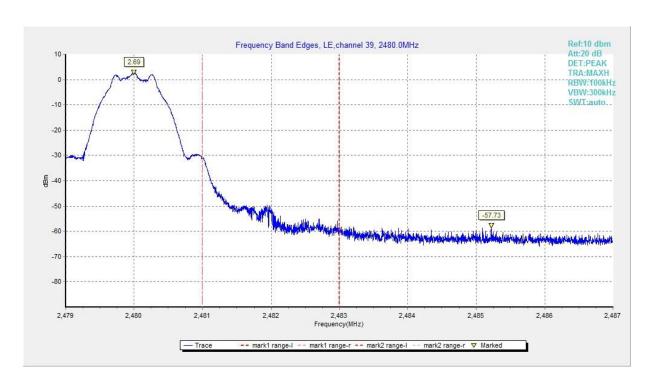


Fig.8 Band Edges (Ch 39), LE 1M



# A.5 Transmitter Spurious Emission - Conducted

### **Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247 (d) &	20dB below peak output power in 100 kHz
RSS-247 5.5/RSS-Gen section 6.13	bandwidth

### **Measurement Results:**

MODE	Channel	Frequency Range	Test Results	Conclusion	
	0	1GHz -3GHz	Fig.9	Р	
	U	3GHz-10GHz	Fig.10	Р	
	10	1GHz -3GHz	Fig.11	Р	
LE1M	39 All channels	3GHz-10GHz	Fig.12	Р	
		1GHz -3GHz	Fig.13	Р	
		3GHz-10GHz	Fig.14	Р	
		All channels	30MHz-1GHz	Fig.15	Р
		10GHz-26GHz	Fig.16	Р	

See below for test graphs.

**Conclusion: Pass** 



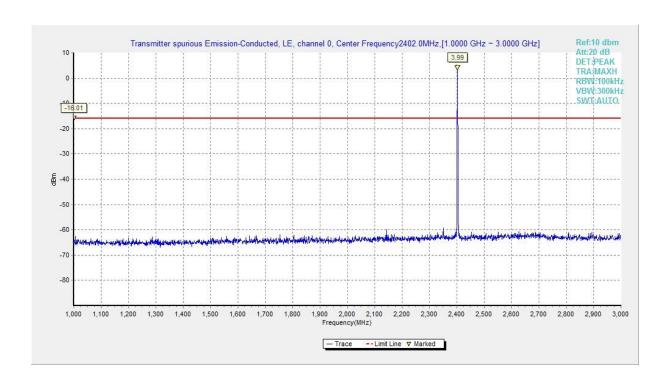


Fig.9 Conducted Spurious Emission (Ch0, 1 GHz-3 GHz), LE 1M

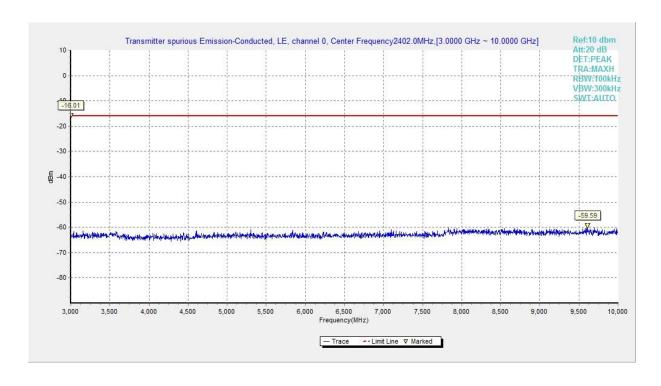


Fig.10 Conducted Spurious Emission (Ch0, 3 GHz-10 GHz), LE 1M



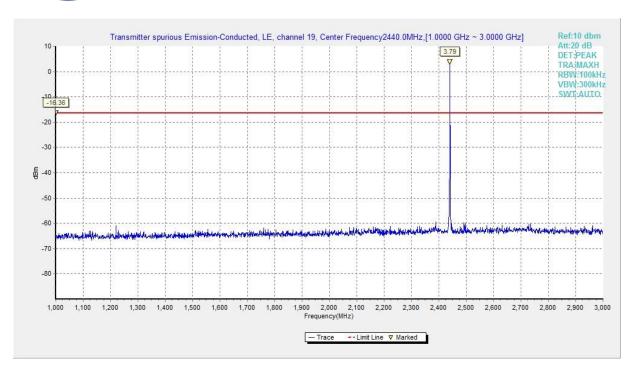


Fig.11 Conducted Spurious Emission (Ch19, 1 GHz-3 GHz), LE 1M

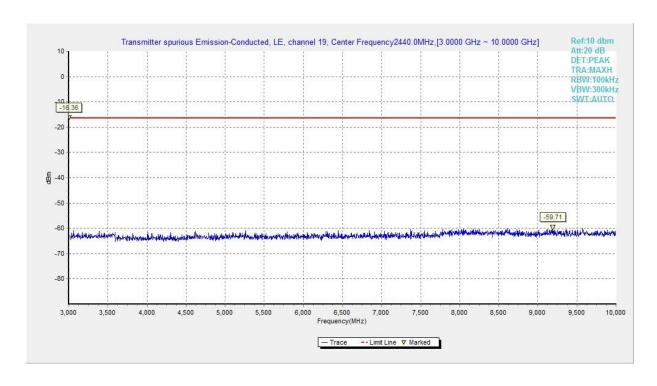


Fig.12 Conducted Spurious Emission (Ch19, 3 GHz-10 GHz), LE 1M



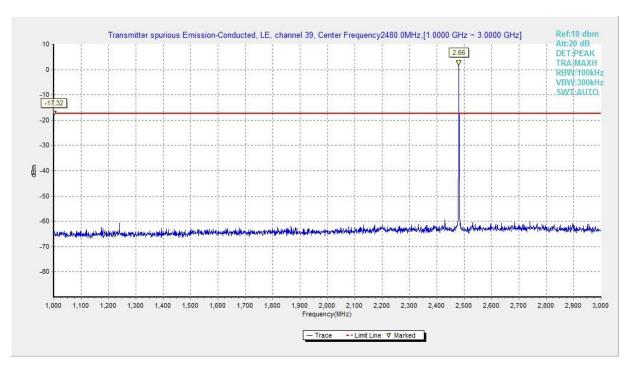


Fig.13 Conducted Spurious Emission (Ch39, 1 GHz-3 GHz), LE 1M

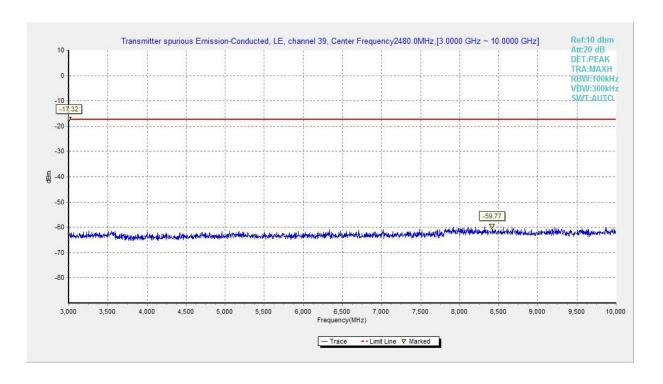


Fig.14 Conducted Spurious Emission (Ch39, 3 GHz-10 GHz), LE 1M



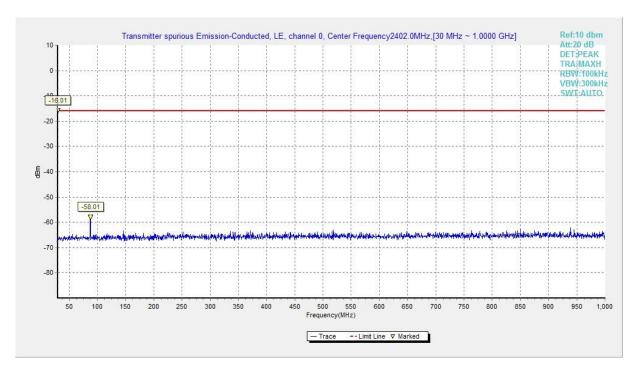


Fig.15 Conducted Spurious Emission (All channels, 30 MHz-1 GHz), LE 1M

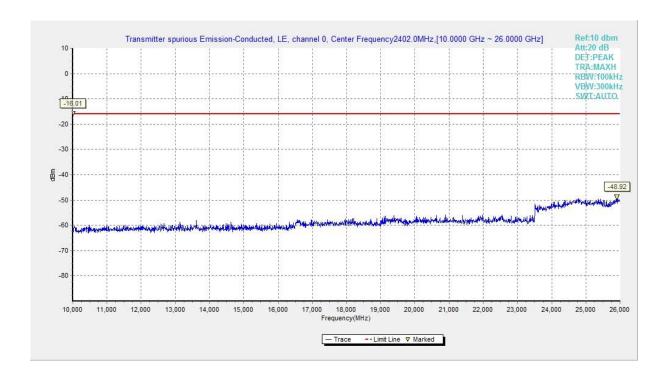


Fig.16 Conducted Spurious Emission (All channels, 10 GHz-26 GHz), LE 1M



### A.6 Transmitter Spurious Emission - Radiated

#### **Measurement Limit:**

Standard	Limit	
FCC 47 CFR Part 15.247, 15.205, 15.209 &	05, 15.209 & 20dB halaw pagk sythyt naver	
RSS-247 section 5.5/RSS-Gen section 6.13	on 6.13 20dB below peak output power	

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

#### Limit in restricted band:

Frequency of emission (MHz)	Field strength(μV/m)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### **Test Condition:**

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

**Note**: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements.



### **Measurement Results:**

Mode	Channel	Frequency Range	Test Results	Conclusion
	0	1 GHz ~3 GHz	Fig.17	Р
	U	3 GHz ~18 GHz	Fig.18	Р
	19	1 GHz ~3 GHz	Fig.19	Р
	19	3 GHz ~18 GHz	Fig.20	Р
	39	1 GHz ~3 GHz	Fig.21	Р
LE 1M	39	3 GHz ~18 GHz	Fig.22	Р
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.23	Р
	Restricted Band(CH39)	2.45 GHz ~ 2.5 GHz	Fig.24	Р
		9 kHz ~30 MHz	Fig.25	Р
	All channels	30 MHz ~1 GHz	Fig.26	Р
		18 GHz ~ 26.5 GHz	Fig.27	Р

See below for test graphs.

**Conclusion: Pass** 

### **GFSK CH0**

Frequency (MHz)	MaxPeak dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
9615.000000	45.64	74.00	28.36	V	4.3
10723.500000	46.17	74.00	27.83	V	6.3
12544.500000	48.31	74.00	25.69	Н	8.7
15297.000000	48.99	74.00	25.01	V	12.2
16511.000000	51.12	74.00	22.88	Н	15.3
17937.000000	51.48	74.00	22.52	V	17.0

Frequency	Average	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
9904.000000	33.31	54.00	20.69	Н	5.4
11488.500000	34.46	54.00	19.54	Н	6.9
12967.500000	35.94	54.00	18.06	V	9.4
14455.000000	37.17	54.00	16.83	Н	11.7
16711.000000	39.41	54.00	14.59	Н	15.4
17909.000000	40.37	54.00	13.63	V	17.4



#### **GFSK CH19**

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
. ,			. ,		
9402.500000	45.16	74.00	28.84	H	3.9
10884.500000	47.63	74.00	26.37	V	6.4
12700.500000	48.74	74.00	25.26	V	9.0
15274.000000	49.63	74.00	24.37	V	11.9
16784.500000	52.10	74.00	21.90	Н	15.9
17908.000000	52.41	74.00	21.59	V	17.4

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
9789.000000	33.64	54.00	20.36	V	4.9
11492.000000	34.95	54.00	19.05	V	7.0
12672.500000	36.59	54.00	17.41	Н	9.0
14462.000000	37.62	54.00	16.38	V	11.8
16743.500000	40.07	54.00	13.93	Н	15.5
17914.000000	41.07	54.00	12.93	Н	17.2

#### **GFSK CH39**

Frequency	MaxPeak	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
9728.000000	45.34	74.00	28.66	Н	4.8
11430.500000	46.87	74.00	27.13	V	6.8
12210.500000	48.18	74.00	25.82	V	8.5
15315.000000	49.37	74.00	24.63	Н	12.1
17060.500000	51.68	74.00	22.32	Н	15.4
17929.000000	52.85	74.00	21.15	V	16.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
9757.500000	33.64	54.00	20.36	Н	4.9
11491.000000	34.88	54.00	19.12	Н	7.0
13243.500000	36.55	54.00	17.45	V	9.8
14461.000000	37.52	54.00	16.48	V	11.8
16815.000000	40.05	54.00	13.95	Н	16.0
17910.500000	41.05	54.00	12.95	Н	17.4

#### Note:

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss.  $P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result=  $P_{Mea}$  +Cable Loss +Antenna Factor-Gain of the preamplifier.



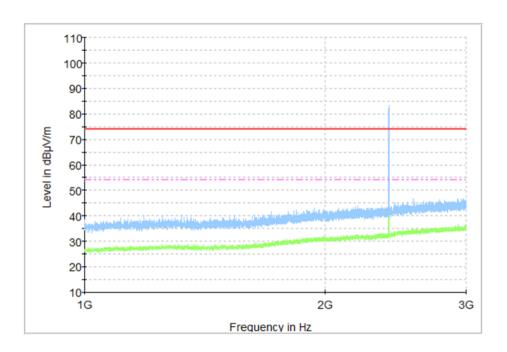


Fig.17 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~3 GHz), LE 1M

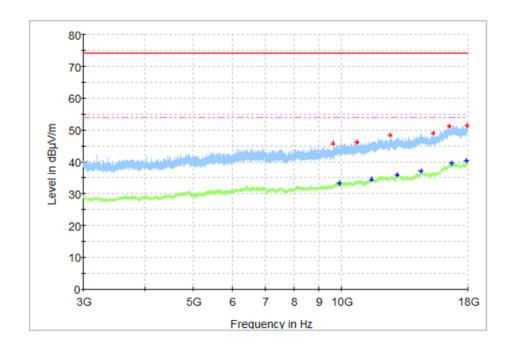


Fig.18 Radiated Spurious Emission (GFSK, Ch0, 3 GHz ~18 GHz), LE 1M



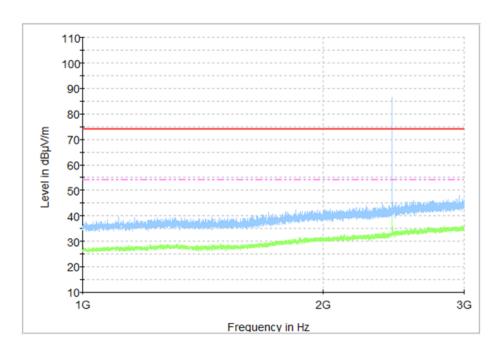


Fig.19 Radiated Spurious Emission (GFSK, Ch19, 1 GHz ~3 GHz), LE 1M

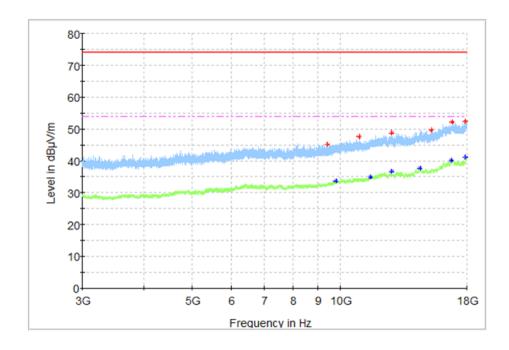


Fig.20 Radiated Spurious Emission (GFSK, Ch19, 3 GHz ~18 GHz), LE 1M



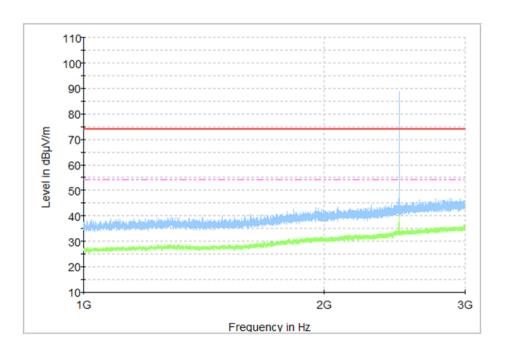


Fig.21 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~3 GHz), LE 1M

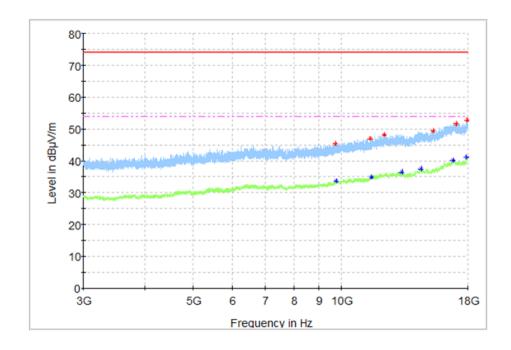


Fig.22 Radiated Spurious Emission (GFSK, Ch39, 3 GHz ~18 GHz), LE 1M



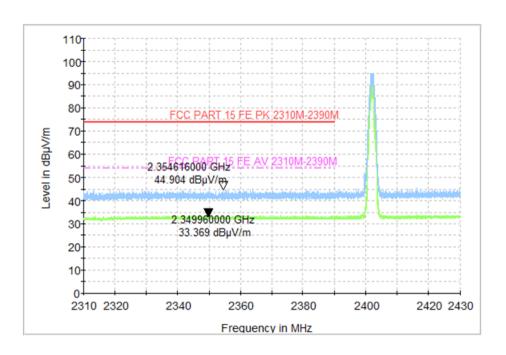


Fig.23 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz), LE 1M

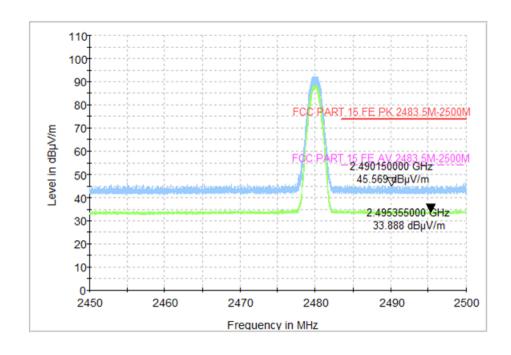


Fig.24 Radiated Band Edges (GFSK, Ch39, 2450GHz~2500GHz), LE 1M



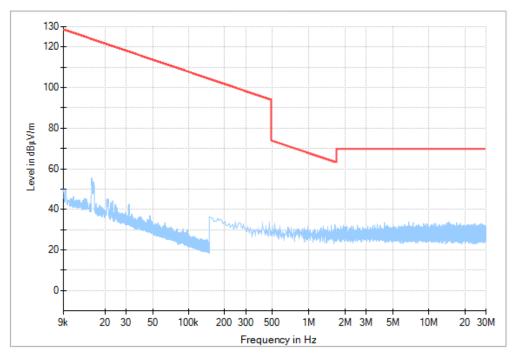


Fig.25 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), LE 1M

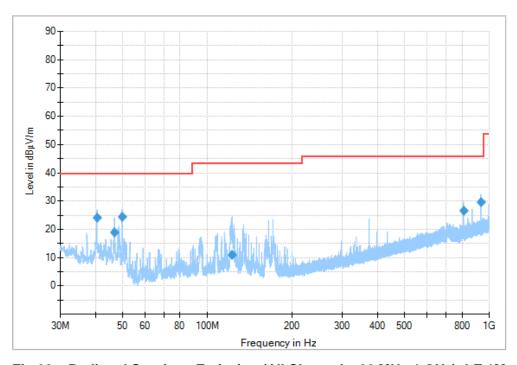


Fig.26 Radiated Spurious Emission (All Channels, 30 MHz-1 GHz), LE 1M



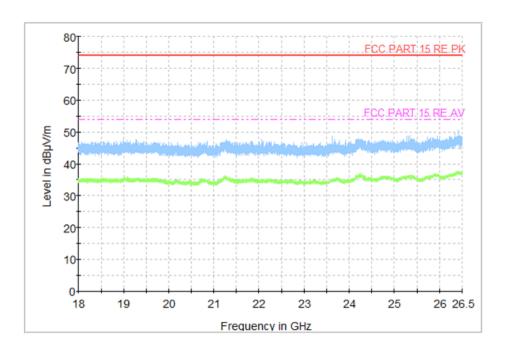


Fig.27 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), LE 1M

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