TEST REPORT

ETSI EN 303 413 V1.1.1 (2017-06)

Report Reference No.....:	**TZ190100535-GNSS**
Compiled by (position+printed name+signature) .:	File administrators Anna Hu
Supervised by (position+printed name+signature) .:	Technique principal Hugo Chen
Approved by (position+printed name+signature) .:	Manager Andy Zhang
Date of issue .....:	2019/1/28

Testing Laboratory Name.....:	Shenzhen Tongzhou Testing Co.,Ltd
Address .....:	1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China
Applicant's name.....:	SHENZHEN DIBET TECHNOLOGY CO., LTD.
Address .....:	Floor 1,Research Building,Tsinghua Hi-tech park,Nanshan district, Shenzhen,Guangdong,China
Test specification.....**:**	
Standard.....:	**ETSI EN 303 413 V1.1.1 (2017-06)**
TRF Originator.....:	Shenzhen Tongzhou Testing Co.,Ltd
Master TRF .....:	Dated 2017-07

Test item description .....:	Smart Watch
Trade Mark.....:	N/A
Manufacturer .....:	SHENZHEN DIBET TECHNOLOGY CO., LTD.
Model/Type reference .....:	CGTW1
List Model.....:	CGTW1,CGTW2,CGTW3,CGTW4,CGTW7,CGTW7P LUS,CGTW15, CGTW15PLUS,CGTW16,CGTW16PLUS,CGTW17, CGTW18, CGTW19,CGTW20,GTW5,GTW6,GTW7,GTW8,GTW9
Modulation Type.....:	BPSK
Operating Frequency.....:	1559 MHz to 1610 MHz
Ratings .....:	DC 5V
Result .....:	**PASS**

TEST REPORT

Test Report No. :	TZ190100535-GNSS	2019/1/28 Date of issue

Equipment under Test	:	Smart Watch
Model /Type	:	CGTW1
Listed Models	:	Refer to Page 1
Applicant	:	SHENZHEN DIBET TECHNOLOGY CO., LTD.
Address	:	Floor 1,Research Building,Tsinghua Hi-tech park,Nanshan district, Shenzhen,Guangdong,China
Manufacturer	:	SHENZHEN DIBET TECHNOLOGY CO., LTD.
Address	:	Floor 1,Research Building,Tsinghua Hi-tech park,Nanshan district, Shenzhen,Guangdong,China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 303 413 V1.1.1 (2017-06) –
Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers;
Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency bands;
Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	2019/1/10
Testing commenced on	:	2019/1/10
Testing concluded on	:	2019/1/28

2.2. Product Description

Name of EUT	Smart Watch
Model(s) Number	CGTW1
List Models	Refer to Page 1
Difference description	All the same except for the appearance and model name.
Hardware version	G72S-MB-V2.6
Software version	G72F_V1
Antenna Type	Integral

Wireless Type	Working Frequency	Modulation Type	Version
GNSS	GPS/GLONASS/Galileo:1559 MHz to 1610 MHz	BPSK	/
WLAN	IEEE 802.11b:2412-2472MHz IEEE 802.11g:2412-2472MHz IEEE 802.11n HT20:2412-2472MHz	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)	/
☒GSM ☒GPRS ☒EGPRS	NON-EU BAND: GSM850: 824-849MHz (TX), 869-894MHz (RX); DCS1900: 1850-1910 MHz (TX), 1930-1990 MHz (RX) EU-BAND: E-GSM900: 880-915MHz (TX), 925-960MHz (RX); DCS1800: 1710-1785 MHz (TX), 1805-1880 MHz (RX)	GMSK, 8PSK	R99

2.3. Equipment Under Test

Power supply system utilised

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

DC 5V

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

2.6. NOTE

Function	Test Standards	Reference Report
GSM	ETSI EN 301 511 V12.1.1 (2017-04)	TZ190100525-GSM
GNSS	ETSI EN 303 413 V1.1.1 (2017-06)	TZ190100525-GNSS
WLAN	ETSI EN 300 328 V2.1.1 (2016-11)	TZ190100525-WLAN
EMC	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Draft ETSI EN 301 489-17 V3.2.0 (2017-03) Draft ETSI EN 301 489-19 V2.1.0 (2017-03) Draft ETSI EN 301 489-52 V1.1.0 (2016-11) EN 55032: 2015 EN 55035: 2017 EN 61000-3-2: 2014 EN 61000-3-3: 2013	TZ190100525-RE

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Tongzhou Testing Co.,Ltd
1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Environmental conditions

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

Normal Temperature: 25°C
High Temperature: 40℃°C
Low Temperature: -10℃°C
Normal Voltage: DC 5V
High Voltage: DC 5.5V
Low Voltage:DC 4.5V
Relative Humidity: 55 %
Air Pressure: 989 hPa

3.3. Test Description

3.3.1 Main Terms

Verdict	Verdict of each test cases.
Test Case	Test cases identification number and description in ETSI specification.

3.3.2 Terms used in Condition column

NTC Normal voltage, Normal Temperature
HTHV High voltage, High Temperature
LTHV High voltage, Low Temperature
HTLV Low voltage, High Temperature
LTLV Low voltage, Low Temperature

3.3.3 Terms used in Verdict column

Pass	This test cases has been tested, and EUT is conformant to the applied standards in the given frequency band.
Fail	This test cases has been tested, but EUT is not conformant to the applied standards in the given frequency band.
N/A	This test case is either not required/not applicable in the specified band or is not applicable according to the specific PICS/PIXIT for the EUT.
Inc	Test case result is ambiguous in the given frequency band.
Decl	Declaration is received from the client to demonstrate the conformity to the relevant specification in the given frequency band.
BR	This test cases is not tested in the given frequency band, but this testcases was tested with pass result for the initial model in the given frequency band.

3.3.4 Sumarry of measurement results

☒ **No deviations from the technical specifications were ascertained**
☐ **There were deviations from the technical specifications ascertained**

Test Specification Clause	Test Case	Test Condition	Pass	Fail	N/A	NP	Remark
4.2.1	Adjacent signal selectivity	NTC	☒	☐	☐	☐	
4.2.2	Dynamic range	NTC	☒	☐	☐	☐	

Remark: The measurement uncertainty is not included in the test result.

3.4. Statement of the measurement uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated and shall correspond to an expansion factor (coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in ETSI TR 100 028 [i.6] and [i.7], in particular in annex D of the ETSI TR 100 028-2 [i.7]. and is documented in the Shenzhen Tongzhou Testing Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device

Hereafter the best measurement capability for Shenzhen Tongzhou Testing Co.,Ltdis reported:

No.	Item	Uncertainty
1	GUE adjacent frequency band selectivity performance	±1.2dB
2	Unwanted Emissions, conducted	±1.3dB
3	All emissions, radiated	±4.7dB

3.5. Equipment Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Signal Generator	Keysight	N5182A	MY4620709	2019/1/3	2020/1/2
2	Signal Generator	Agilent	SML03	102924/0013	2019/1/3	2020/1/2
3	Power Sensor	Agilent	U2021XA	MY5365004	2019/1/3	2020/1/2
4	Wideband Antenna	schwarzbeck	VULB 9163	958	2018/11/20	2020/11/19
5	Horn Antenna	schwarzbeck	9120D-1141	1574	2018/11/20	2020/11/19
6	EMI Test Receiver	R&S	ESCI	100849/003	2019/1/3	2020/1/2
7	Controller	MF	MF7802	N/A	N/A	N/A
8	Amplifier	schwarzbeck	BBV 9743	209	2019/1/3	2020/1/2
9	Amplifier	Tonscend	TSAMP-0518SE	--	2019/1/3	2020/1/2
10	Temperature/Humidity Meter	Lexiang	HTC-1	165137	2019/01/05	2020/01/04
11	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2019/1/3	2020/1/2
12	High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2019/1/3	2020/1/2
13	RF Cable	HUBER+SUHNER	RG214	N/A	2019/1/3	2020/1/2
14	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2019/1/3	2020/1/2
15	Horn Antenna	ETS	3117	00218874	2018/11/20	2020/11/19

4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 303 413 REQUIREMENTS

4.1.1. GUE adjacent frequency band selectivity test

LIMIT

According to ETSI EN 303 413 V1.1.1 (2017-06) §4.2.1.2

The C/N0 metric reported by the GUE for all GNSS and GNSS signals given in table 4-1 and supported by the GUE shall not degrade by more than the value given in equation 4-1 when an adjacent frequency signal is applied. The adjacent frequency signal is defined in table 4-4, with the frequencies and power levels defined in table 4-2 and/or in table 4-3 depending on the RNSS bands supported by the GUE.

Equation 4-1: Maximum degradation in C/N0

$$\triangle C/N0 \leqslant 1 \text{ dB}$$

Table 4-2: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 559 MHz to 1 610 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
1 518 to 1 525	1 524	-65	MSS (space-to-Earth) band
1 525 to 1 549	1 548	-95	MSS (space-to-Earth) band
1 549 to 1 559	1 554	-105	MSS (space-to-Earth) band
1 559 to 1 610	GUE RNSS band under test		
1 610 to 1 626	1 615	-105	MSS (Earth-to-space) band
1 626 to 1 640	1 627	-85	MSS (Earth-to-space) band

Table 4-3: Frequency bands, adjacent frequency signal test point centre frequencies and power levels for the 1 164 MHz to 1 300 MHz RNSS band

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Comments
960 to 1 164	1 154	-75	AM(R)S, ARNS band
1 164 to 1 215	GUE RNSS band under test		
1 215 to 1 260	GUE RNSS band under test		
1 260 to 1 300	GUE RNSS band under test		
1 300 to 1 350	1 310	-85	Radiolocation, ARNS, RNSS (Earth-to-space) band

Table 4-4: Adjacent frequency signal

Parameter	Value	Comments
Frequency	See table 4-2 and table 4-3	
Power level	See table 4-2 and table 4-3	
Bandwidth	1 MHz	See clause B.1 for details
Format	AWGN	

Annex B contains details of the adjacent frequency signal and the GNSS signals that shall be used in performing the conformance tests. Annex C contains a detailed explanation of the C/N0 metric. Clause C.3 describes the calculation of the nominal bounding value for the adjacent frequency signal power level at the points closest to the operating band given in table 4-2.

TEST CONFIGURATION

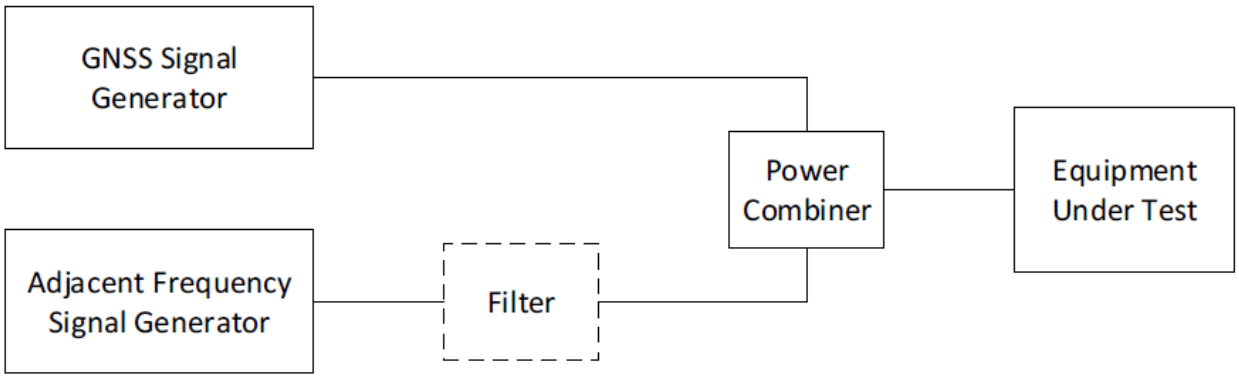


Figure 5-1: Conducted measurement setup for EUT adjacent frequency band selectivity

TEST PROCEDURE
Please refer to ETSI EN 303 413 V1.1.1 Sub-clause 5.4

5.4.3 Test method for GUE utilizing the 1 559 MHz to 1 610 MHz RNSS band

a) Configure the GNSS signal generator to simulate those GNSS and GNSS signals from table 4-1 declared as supported by the GUE, with power levels and other details as specified in clause B.2.

b) With the adjacent frequency signal switched off, the EUT shall be given sufficient time to acquire all simulated satellites from the declared GNSS system(s).

c) Record the baseline C/N0 value(s) reported by the EUT. Sufficient filtering shall be used to obtain a stable value. C/N0 may be averaged across all the satellites in view for each GNSS constellation. However, C/N0 shall not be averaged across satellite signals in different GNSS constellations. For a multi-GNSS EUT, there shall be a separate C/N0 value recorded for each GNSS constellation and each GNSS signal supported.

d) The adjacent frequency signal generator shall be configured to generate the signal defined in table 4-4, at the first test point centre frequency and signal power level as specified in table 4-2.

e)

f) The adjacent frequency signal shall be switched on, and the EUT's C/N0 value(s) recorded as in step 3) to measure the degradation with respect to the baseline value(s) recorded in step 3).

g) Test point Pass/Fail Criteria: If the C/N0 degradation from step 5) does not exceed the value in equation 4-1, then this test point is set to "pass". If the C/N0 degradation exceeds the value in equation 4-1, then this test point is set to "fail." For a multi-GNSS and multi-signal EUT, there shall be a separate pass/fail determination for each GNSS and for each GNSS signal supported. If the C/N0 degradation exceeds the value in equation 4-1 for any supported GNSS or supported GNSS signal, then this test point is set to "fail".

h) Step 1) through step 6) shall be repeated for all test point centre frequencies (and associated signal power level) specified in table 4-2.

If the EUT passes the C/N0 degradation test for all test points for all GNSS constellations and all GNSS signals declared as supported from table 4-1, the EUT shall be deemed to "pass". If the C/N0 degradation test fails for any GNSS constellation or GNSS signal at any of the test points, the EUT shall be deemed to "fail".

5.4.4 Test method for GUE utilizing the 1 164 MHz to 1 300 MHz RNSS bands

For a GUE also utilizing the RNSS bands in the 1 164 MHz to 1 300 MHz range, the test method in clause 5.4.3 (step 1) through step 7), inclusive), shall be repeated using the adjacent frequency test point centre frequencies and associated signal power levels specified in table 4-3.

If the EUT passes the C/N0 degradation tests as defined in both clause 5.4.3 and clause 5.4.4, the EUT shall be deemed to "pass". If the C/N0 degradation test fails tests as defined in either or both of clause 5.4.3 or clause 5.4.4, the EUT shall be deemed to "fail".

TEST RESULTS

GNSS type	Frequency Band(MHz)	Test point centre frequency(MHz)	Adjacent frequency signal power level (dBm)	C/N0(without interfence)	C/N0(with interfence)	△C/N0	Result
GPS	1 518 to 1 525	1 524	-65	47	47	0	Pass
GLONASS				39	39	0	Pass
Galileo				36	36	0	Pass
SBAS				--	--	--	--
BDS				--	--	--	--
GPS	1 525 to 1 549	1 548	-95	47	47	0	Pass
GLONASS				39	39	0	Pass
Galileo				36	36	0	Pass
SBAS				--	--	--	--
BDS				--	--	--	--
GPS	1 549 to 1 559	1 554	-105	47	47	0	Pass
GLONASS				39	39	0	Pass
Galileo				36	36	0	Pass
SBAS				--	--	--	--
BDS				--	--	--	--
GPS	1 610 to 1 626	1 615	-105	47	47	0	Pass
GLONASS				39	39	0	Pass
Galileo				36	36	0	Pass
SBAS				--	--	--	--
BDS				--	--	--	--
GPS	1 626 to 1 640	1 627	-85	47	47	0	Pass
GLONASS				39	39	0	Pass
Galileo				36	36	0	Pass
SBAS				--	--	--	--
BDS				--	--	--	--

4.1.2. Spurious emissions

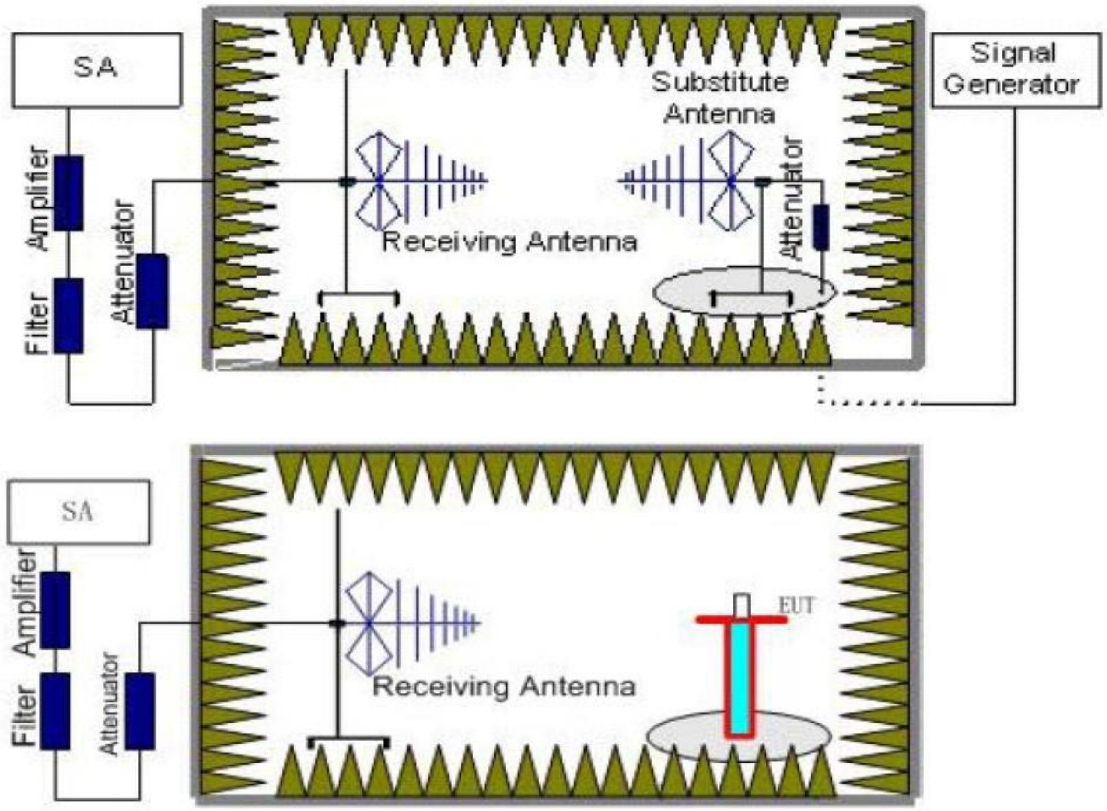
LIMIT

The spurious emissions of the GUE shall not exceed the values given in table 4-5.
In case of a GUE with an external antenna connector, these limits apply to emissions at the antenna port (conducted).
For emissions radiated by the cabinet or for emissions radiated by a GUE with an Integral antenna (without an antenna connector), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Frequency	Maximum power, e.r.p.	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 KHz
30 MHz to 8.3 GHz	-47 dBm	1 MHz

TEST CONFIGURATION

Effective Radiated Power measurement (30 MHz to 8.3 GHz)



TEST PROCEDURE

Please refer to ETSI EN 303 413 V1.1.1 Sub-clause 5.5.2.2

a) The EUT was powered ON and placed on a 1.5m high table at a 3 meter fully Anechoic Chamber.
b) The antenna of the transmitter was extended to its maximum length. Modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
c) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
d) Steps a) to c) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
e) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
f) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable.
g) With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step c) is obtained for this set of

conditions.

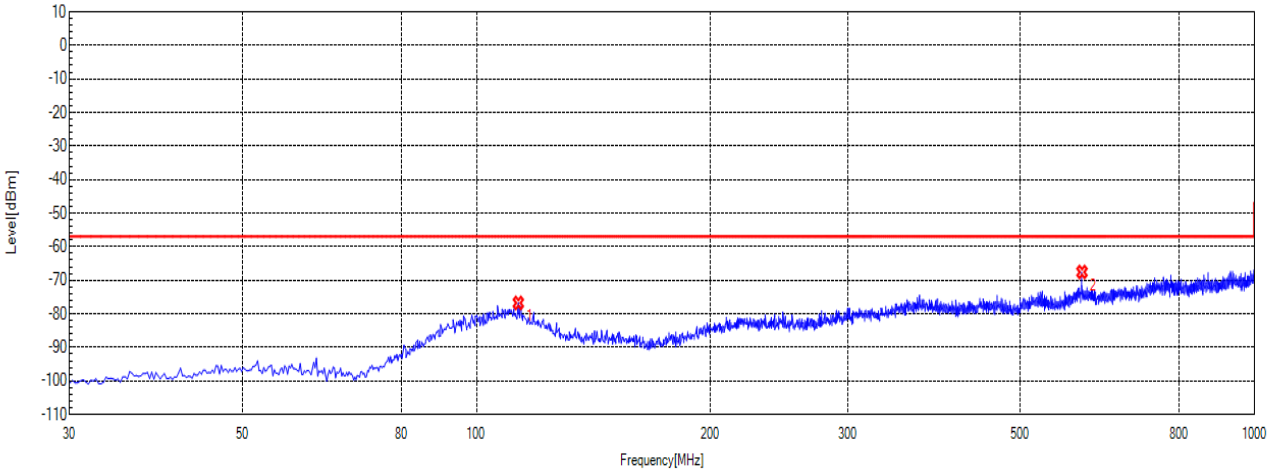
h) The output power into the substitution antenna was then measured.

i) Steps f) and h) were repeated with both antennas polarized.

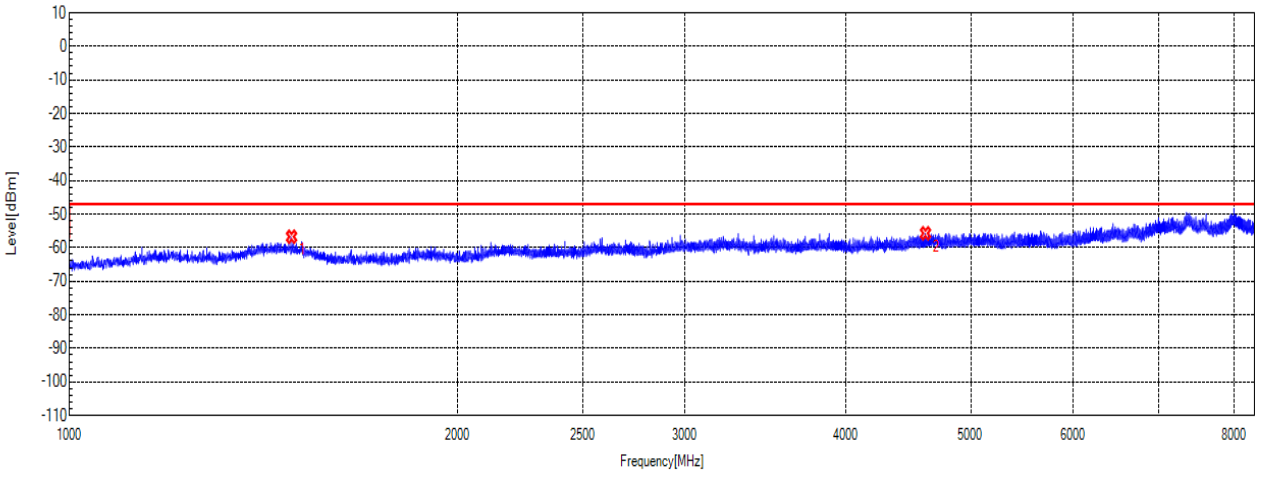
j) Calculate power in dBm by the following formula:
ERP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBd)
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
EIRP=ERP+2.15dB
Where: Pg is the generator output power into the substitution antenna.

k) If applicable, Repeat above procedures until all frequencies measured was complete.

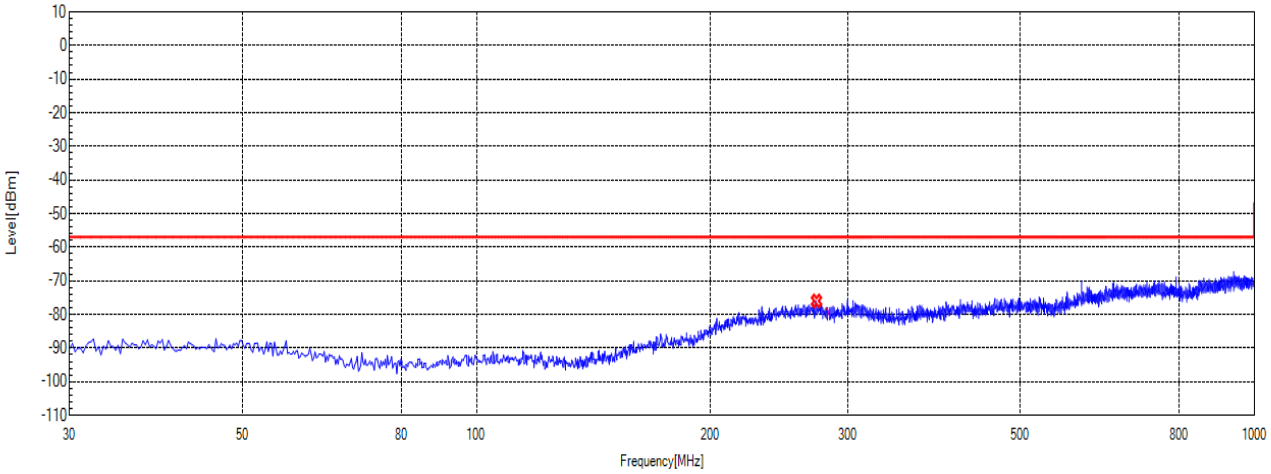
TEST RESULTS



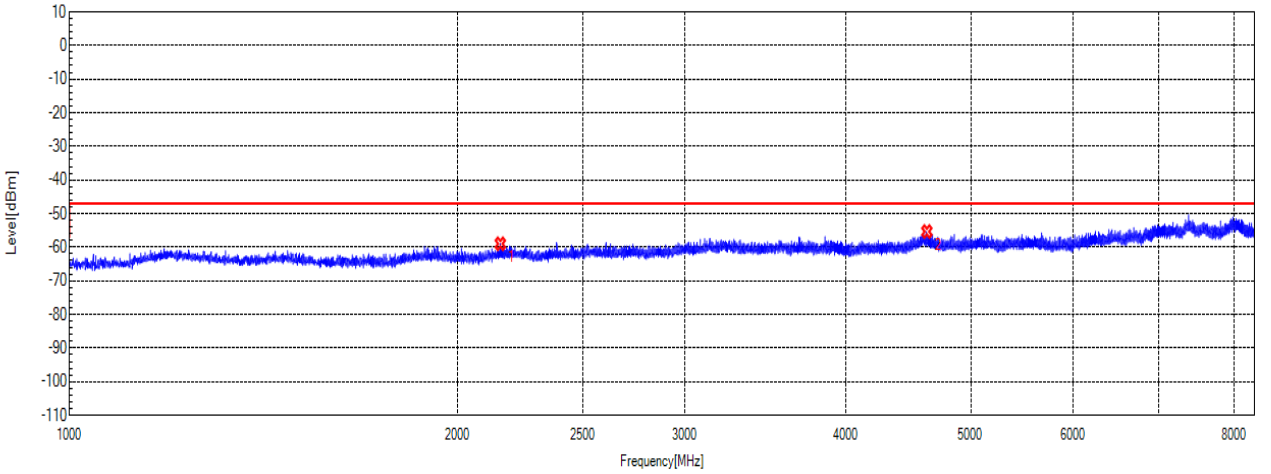
NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Air [dB]	EUT Pol.	Ant. Pol.
1	113.178	-76.75	-57.00	19.75	1.45	0.00	1.45	X	Vertical
2	600.118	-67.53	-57.00	10.53	6.98	0.00	6.98	X	Vertical



NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Air [dB]	EUT Pol.	Ant. Pol.
1	1486.18	-56.73	-47.00	9.73	-0.32	0.00	-0.32	X	Vertical
2	4611.31	-55.71	-47.00	8.71	5.63	0.00	5.63	X	Vertical



NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Air [dB]	EUT Pol.	Ant. Pol.
1	273.47	-75.97	-57.00	18.97	3.17	0.00	3.17	X	Horizontal



NO.	Freq. [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Path [dB]	Air [dB]	EUT Pol.	Ant. Pol.
1	2157.78	-58.97	-47.00	11.97	-0.78	0.00	-0.78	X	Horizontal
2	4622.625	-55.33	-47.00	8.33	5.76	0.00	5.76	X	Horizontal

5. External and Internal Photos of the EUT

Reference to the test report No. TZ190100535-RE

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