RED-Radio Test Report

For

ASBISc Enterprises PLC

Kids Smartwatch

Model No.: CNE-KW51, CNE-KW51XX(XX could be A-Z)

Prepared For	:	ASBISc Enterprises PLC
Address	:	43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasios, Limassol, Cyprius
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
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Report Number	:	SZAWW181220001-04W
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Date of Test	:	Dec. 20, 2018~ Jan. 15, 2019
Date of Report	:	Jan. 15, 2019

Contents

TEST REPORT

Applicant	:	ASBISc Enterprises PLC
Manufacturer	:	ASBISc Enterprises PLC
Product Name	:	Kids Smartwatch
Model No.	:	CNE-KW51, CNE-KW51XX(XX could be A-Z)
Trade Mark	:	Canyon
Rating(s)	:	Input: DC 5V, 300mA (with DC 3.7V, 420 mAh Battery inside)

Test Standard(s) : **ETSI EN 303 413 V1.1.1 (2017-06)**

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.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test: Dec. 20, 2018~ Jan. 15, 2019

Prepared By: Oliay Yang

(Engineer / Oliay Yang)

Reviewer: Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer: Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	ASBISc Enterprises PLC
Address	:	43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasios, Limassol, Cyprius
Manufacturer	:	ASBISc Enterprises PLC
Address	:	43 Kolonakiou street, Diamond Court, 4103, Ayios Athabasios, Limassol, Cyprius
Factory	:	Jiangsu JinYiDa Energy Technology Co.,Ltd
Address	:	JingKou Industrial Park, JingKou District, Zhenjiang City

1.2. Description of Device (EUT)

Product Name	:	Kids Smartwatch	
Model No.	:	CNE-KW51, CNE-KW51XX(XX could be A-Z) (Note: All samples are the same except the appearance, so we prepare "CNE-KW51" for test only.)	
Trade Mark	:	Canyon	
Test Power Supply	:	DC 3.7V Battery inside	
Product Description	:	Operation Frequency:	1575.42MHz For GPS
		Number of Channel:	1 Channel
		Modulation Type:	BPSK
		Signal level:	-130dBm
		Antenna Type:	Ceramic Antenna
		Antenna Gain(Peak):	2.3 dBi

Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2)This report is for GPS.

1.3. Auxiliary Equipment Used During Test

2. Summary of Test Results

2.1. Test Standard Description

ETSI EN 303 413 V1.1.0Satellite 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.

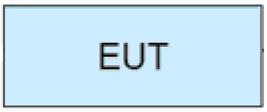
2.2. Summary of test result

No.	Test Items	Clause No.	Result
1	Adjacent signal selectivity	4.2.1	PASS
2	Spurious emissions	4.2.2	PASS

2.3.Assistant equipment used for test

N/A

2.4.Block Diagram



2.5.Test mode

Tested mode 1: GPS Band 1

2.6.Test Conditions

	Normal Conditions
Temperature range	15-35℃
Humidity range	20-75%
Pressure range	86-106kPa
Power supply	DC 3.7V

2.7.Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.50dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.04dB	Polarize: V
	3.02dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.56dB	Polarize: H
	3.84dB	Polarize: V
Uncertainty for radio frequency	1×10-9	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.6℃	
Uncertainty for humidity	3%	
Uncertainty for DC and low frequency voltages	0.06%	

2.8. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 19, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 19, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year

3. GUE adjacent frequency band selectivity performance

3.1. Definition

3.1.1 GUE adjacent frequency band selectivity definition: GUE adjacent frequency band selectivity is the ability of the GUE to achieve the specified performance in the presence of noise produced by signals operating in accordance with the allocation table of the ITU Radio Regulations [i.16] in frequency bands adjacent or near-adjacent to the relevant RNSS band.

3.1.2 C/ N0 degradation metric definition: The C/ N0 degradation metric is used to assess the performance of the GUE against the technical requirements. It is derived as follows.

In the absence of interference, the carrier to noise-density ratio (C/ N0) is the ratio of the received GNSS signal carrier power C, in watts, to the noise power spectral density N0. The noise power spectral density (N0, in W/Hz) is given by following expression:

N0 = kT (C-1)

where k is Boltzmann's constant, 1,38 $\times$ 10^{-23}, in joules (equivalent to W/Hz) per Kelvin and T is the GUE system noise temperature (in K). Using a decibel scale the baseline C/ N0 with no interference present is:

C/ N0 BL = 10 $\times$ log10(C/ N0) dB-Hz (C-2)

When interference is present, a reduction in C/ N0 can occur that is equivalent to an addition of I W/Hz in the in-band noise floor and in some cases a reduction in signal power δc to the received satellite signal. The resulting carrier to noise-and-interference-density ratio C/(N0 +I), may be expressed as:

C/(N0 +I) = 10 $\times$ log10((C- δc) / (N0 + I)) dB-Hz (C-3)

Where δc = 0 except for the case when the interference power is large enough to drive the GUE front end to a nonlinear regime. The difference between these two conditions, that is the interference conditions versus the noninterference condition, is given by:

Δ C/ N0 = C/(N0 +I) − C/ N0 BL

3.1.3 Adjacent frequency signal definition:

The 1 MHz filtered AWGN signal used for interferer simulation shall follow the requirements specified in this clause:

- The passband shall have a bandwidth of at least 1 MHz. The bandwidth is defined as the frequency range in which the attenuation of the filter is not more than 3 dB.
- Within the 1 MHz bandwidth of the passband, the ripple shall be less than 3 dB.
- The stopband attenuation shall be at least 62 dB.
- The transition band between the passband and stopband is 4 MHz wide.
- Within the transition band, the filter shall not exceed the maximum passband gain.
- The power level of the interferer signal shall comply with the values defined in table 4-2 and/or table 4-3 when measured over the 1 MHz bandwidth of the passband.

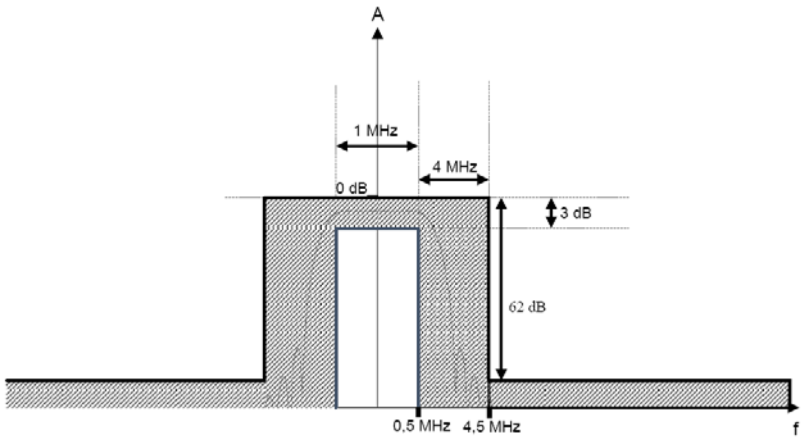


Figure B-1: Adjacent frequency signal

3.2. Specifications

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.

Table 4-1: GNSS, GNSS signals and RNSS frequency bands

GNSS	GNSS Signal Designations	RNSS Frequency Band (MHz)
BDS	B1I	1 559 to 1 610
Galileo	E1	1 559 to 1 610
	E5a	1 164 to 1 215
	E5b	1 164 to 1 215
	E6	1 215 to 1 300
GLONASS	G1	1 559 to 1 610
	G2	1 215 to 1 300
GPS	L1	1 559 to 1 610
	L2	1 215 to 1 300
	L5	1 164 to 1 215
SBAS	L1	1 559 to 1 610
	L5	1 164 to 1 215

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	

3.3. Test Procedure

The following test equipment is recommended for performing the tests:

1.GNSS signal generator capable of simulating the GNSS constellations and GNSS signals declared as supported by the EUT.

2.RF signal generator capable of generating the adjacent frequency signal specified in table 4-4.

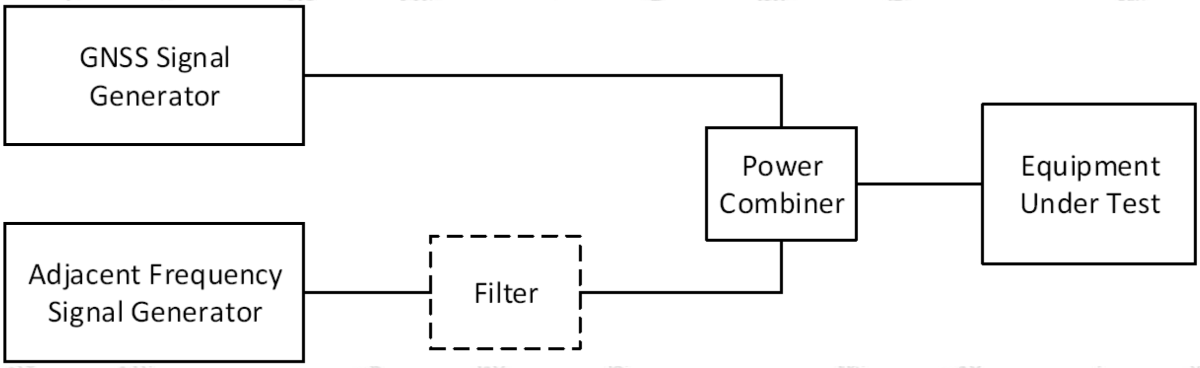
3.Filter for ensuring the test is not adversely affected by OOBE from the RF signal generator into the RNSS band if necessary.

4.RF power combiner for combining the GNSS signal(s) and the adjacent frequency signal.

5.Recording C/ N0 as reported by the EUT before and after application of the adjacent frequency signal.

6.Establishing the RF power of the test signals at the input to the EUT (this may be accomplished by means of a directional coupler and power meter,

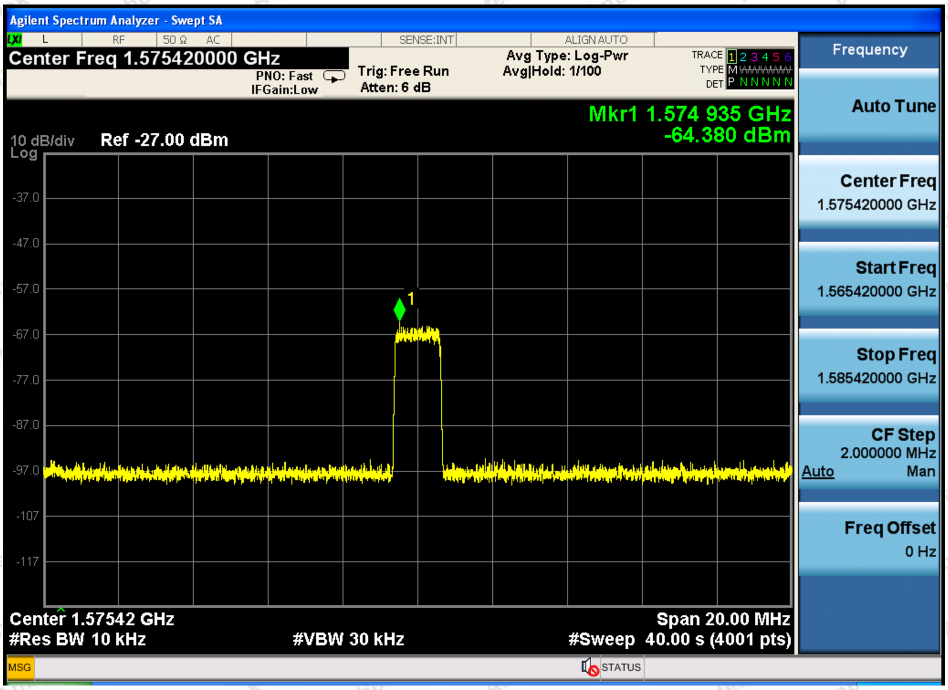
3.4. Test Setup



3.5. Test Result

Frequency band (MHz)	Test point centre frequency (MHz)	Adjacent frequency signal power level (dBm)	Measured C/N0 (dB-Hz)				
			No interfering signal	With interfering signal	Decrease of C/N0	Decrease ≤ 1 dB?	
1 518 to 1 525	1524	-65	/	/	/	BDS	N/A
			/	/	/	Galileo	N/A
			/	/	/	GLONASS	N/A
			40.1dB-Hz	40.1dB-Hz	0	GPS	Pass
			/	/	/	SBAS	N/A
1 525 to 1 549	1548	-95	/	/	/	BDS	N/A
			/	/	/	Galileo	N/A
			/	/	/	GLONASS	N/A
			39.8dB-Hz	39.8dB-Hz	0	GPS	Pass
			/	/	/	SBAS	N/A
1 549 to 1 559	1554	-105	/	/	/	BDS	N/A
			/	/	/	Galileo	N/A
			/	/	/	GLONASS	N/A
			39.7dB-Hz	39.7dB-Hz	0	GPS	Pass
			/	/	/	SBAS	N/A
1 610 to 1 626	1615	-105	/	/	/	BDS	N/A
			/	/	/	Galileo	N/A
			/	/	/	GLONASS	N/A
			39.8dB-Hz	39.8dB-Hz	0	GPS	Pass
			/	/	/	SBAS	N/A
1 626 to 1 640	1627	-85	/	/	/	BDS	N/A
			/	/	/	Galileo	N/A
			/	/	/	GLONASS	N/A
			38.9dB-Hz	39.3dB-Hz	0	GPS	Pass
			/	/	/	SBAS	N/A

Adjacent frequency signal at 1575.42MHz



4. Receive Spurious Emission

4.1. Test Definition

Receiver spurious emissions are emissions at any frequency when the GUE is in receive-only operating mode.

4.2. Test Limit

Table 4-5: Spurious emission limits

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz

4.3. Test Procedure

In case of conducted measurements, the EUT shall be connected to the measuring equipment via an attenuator.
If required, the necessary GNSS signals shall be applied to the EUT.
The spectrum in the spurious domain shall be searched for emissions that exceed the limit values given in table 4-5 or that come to within 6 dB below these limits. Each occurrence shall be recorded.
The measurement procedure contains 2 parts.
4.3.1. Pre-scan
The procedure in step 1) to step 4) below shall be used to identify potential unwanted emissions of the EUT:
1) The sensitivity of the spectrum analyser should be such that the noise floor is at least 12 dB below the limits given in table 4-5.
2) The emissions over the range 30 MHz to 1 000 MHz shall be identified.
Spectrum analyser settings:

- Resolution bandwidth: 100 kHz
- Video bandwidth: 300 kHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ⩾ 19 400 (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 4.3.2 and compared to the limits given in table 4-5.
3) The emissions over the range 1 GHz to 8,3 GHz shall be identified.
Spectrum analyser settings:

- Resolution bandwidth: 1 MHz
- Video bandwidth: 3 MHz
- Filter type: 3 dB (Gaussian)
- Detector mode: Peak
- Trace Mode: Max Hold
- Sweep Points: ⩾ 14 600 (for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented)
- Sweep time: Auto

Wait for the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 4.3.2 and compared to the limits given in table 4-5.

4) In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), step 2) and step 3) shall be repeated for each of the active receive chains, Ach.

The limits used to identify emissions during this pre-scan shall be reduced by 10 × log10(Ach).

4.3.2. Measurement of the emissions identified during the pre-scan

The procedure in step 1) to step 4) below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

1) The level of the emissions shall be measured using the following spectrum analyser settings:

- Measurement Mode: Time Domain Power.
- Centre Frequency: Frequency of the emission identified during the pre-scan.
- Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz).
- Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz).
- Frequency Span: Zero Span.
- Sweep mode: Single Sweep.
- Sweep time: 30 ms.
- Sweep points: ≥ 30 000.
- Trigger: Video (for burst signals) or Manual (for continuous signals).
- Detector: RMS.

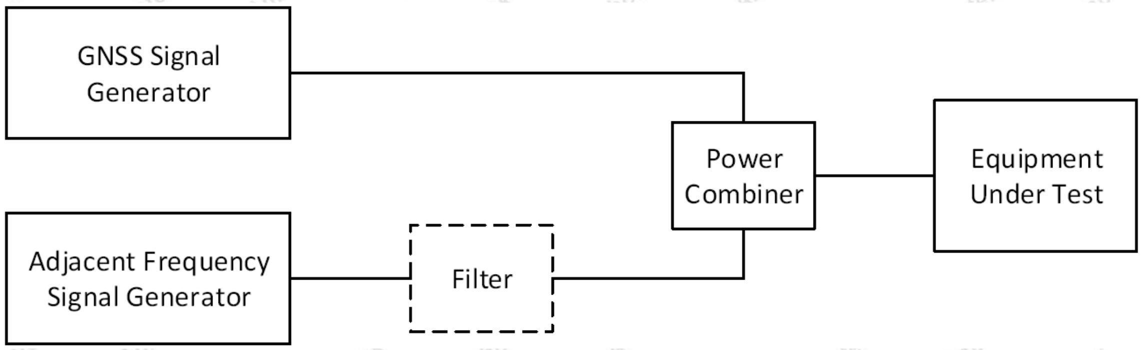
2) Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the RMS value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to the start and stop times of the sweep.

3) In case of conducted measurements on smart antenna systems (equipment with multiple receive chains), step 2) shall be repeated for each of the active receive chains, Ach.

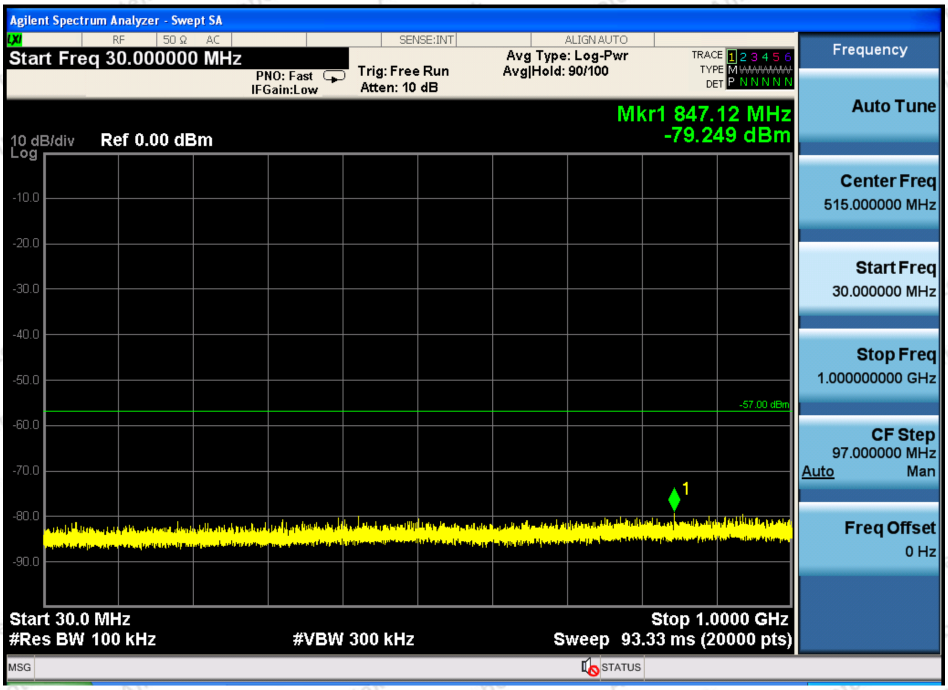
Sum the measured power (within the observed window) for each of the active receive chains.

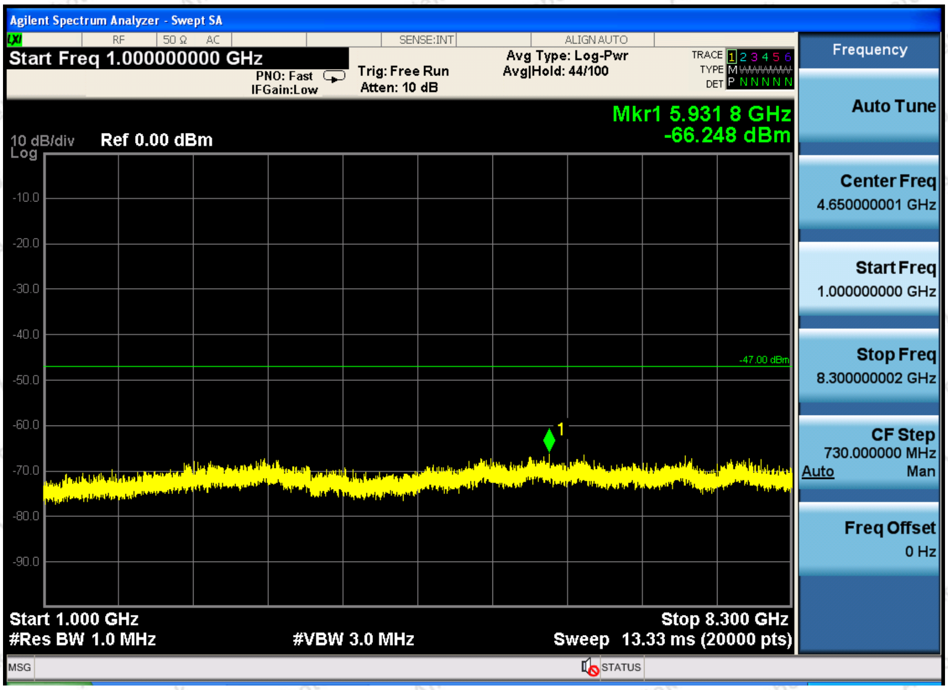
4) The value defined in step 3) shall be compared to the limits defined in table 4-5.

4.4. Test Setup



4.5. Test Result





5. Photos of test setup

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