

RADIO TEST REPORT

Report No:STS1808137W01

S T S

A

Issued for

Zini Mobiles Limited

1310, Block B, Zhongshen Garden Building, Caitian Road, Futian District, Shenzhen, China.

Product Name:	World smallest phone
Brand Name:	ZANCO
Model Name:	tiny t1
Series Model:	tiny t2, tiny t3, tiny t4, tiny t5, tiny t6
FCC ID:	2AL8R-TINY
Test Standard:	FCC Part 22H and 24E

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TEST RESULT CERTIFICATION

Applicant's name	Zini Mobiles Limited			
Address	1310, Block B, Zhongshen Garden Building, Caitian Road, Futian District, Shenzhen, China.			
Manufacture's Name	Zini Mobiles Limited			
Address	1310, Block B, Zhongshen Garden Building, Caitian Road, Futian District, Shenzhen, China.			
Product discription				
Product Name:	World smallest phone			
Brand Name:	ZANCO			
Model Name:	tiny t1			
Series Model	tiny t2, tiny t3, tiny t4, tiny t5, tiny t6			
Test Standards	FCC Part 22H and 24E			
Test procedure	KDB 971168 D01 v03r01,ANSI C63.26(2015)			
This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of STS, this document				
	S, personal only, and shall be noted in the revision of the document.			
Date of Test				
Date of performance of tests	15 Aug. 2018~30 Aug. 2018			

Date of Issue 31 Aug. 2018

Test Result..... Pass

Testing Engineer :	Chins cher
	(Chris chen)
Technical Manager :	Sean She
	(Sean she)
Authorized Signatory :	Virtarti Mousi
	(Vita Li)

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A5.FREQUENCY STABILITY

APPENDIX BPHOTOS OF TEST SETUP

A7. BAND EDGE

A6. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

A8. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

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1 INTRODUCTION

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	31 Aug. 2018	STS1808137W01	ALL	Initial Issue



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SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The radiated emission testing was performed according to the procedures of KDB 971168 D01 v03r01 and ANSI C63.26(2015)

FCC Rules	Test Description	Test Limit	Test Result	Reference
2.1049	Conducted OutputPower	Reporting Only	PASS	
2.0146 24.232	Peak-to-AverageRatio	< 13 dB	PASS	
2.1046 22.913 24.232	Effective Radiated Pow- er/Equivalent Isotropic Radiated Power	< 7 Watts max. ERP(Part 22) < 2 Watts max. EIRP(Part 24)	PASS	
2.1049 22.917 24.238	Occupied Bandwidth	Reporting Only	PASS	
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)	PASS	
2.1051 22.917 24.238	Spurious Emission at Antenna Terminals	< 43+10log10(P[Watts])	PASS	
2.1053 22.917 24.238	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	
2.1051 22.917 24.238	Band Edge	< 43+10log10(P[Watts])	PASS	

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Report No.: STS1808137W01

1 INTRODUCTION 1.1 TEST FACTORY Shenzhen STS Test Services Co., Ltd. Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China CNAS Registration No.: L7649; FCC Registration No.: 625569 IC Registration No.: 12108A; A2LA Certificate No.: 4338.01;

1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the UCISPR measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance. \circ

No.	Item	Uncertainty
1	RF power, conducted	±0.70dB
2	Spurious emissions, conducted	±1.19dB
5	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
6	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
7	All emissions, radiated (>1G)	±3.03dB
8	Temperature	±0.5°C
9	Humidity	±2%



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2 PRODUCT INFORMATION

Product Name	World smallest phone	
Trade Name	ZANCO	
Model Name	tiny t1	
Series Model	tiny t2, tiny t3, tiny t4, tiny t5, tiny t6	
Model Difference	Only different in model name and color	
	GSM:	
Tx Frequency:	850: 824 MHz ~ 849MHz	
	1900: 1850 MHz ~ 1910MHz	
	GSM:	
Rx Frequency:	850: 869 MHz ~ 894 MHz	
	1900: 1930 MHz ~ 1990MHz	
Max RF Output Power:	GSM850:31.89dBm, PCS1900:28.8dBm	
Type of Emission:	GSM(850): 323KGXW; GSM(1900): 318KGXW	
SIM Card:	Only support single SIM Card.	
Antenna:	PIFA Antenna	
Antenna gain:	GSM 850: 0dBi ,PCS 1900:0dBi	
Power Supply:	DC 3.7V by battery	
Battery parameter:	Capacity: 190mAh, Rated Voltage: 3.7V	
Extreme Vol. Limits:	DC 3.4 V to 4.2V (Nominal DC3.7V)	
Extreme Temp. Tolerance:	-30℃ to +50℃	
Hardware version number:	T78_v2.0	
Software version number:	T78_OVERSEA_ZANCO_20170911	
** Note: The High Voltage 4.	2V and Low Voltage 3.4V was declared by manufacturer, The EUT	
couldn't be operate normally	with higher or lower voltage.	





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3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to

find the maximum emission.

Radiated emissions were investigated as following frequency range:

- 1. 30 MHz to 10th harmonic for GSM850.
- 2. 30 MHz to 10th harmonic for GSM1900.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

	TEST MODES		
BAND	RADIATED TCS	CONDUCTED TCS	
GSM 850	GSM LINK	GSM LINK	
GSM 1900	GSM LINK	GSM LINK	

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4 MEASUREMENT INSTRUMENTS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibra- tion	Calibrated Until
EMI Test Receiver	R&S	ESCI	102086	2017.10.15	2018.10.14
Signal Analyzer	Agilent	N9020A	MY49100060	2017.10.15	2018.10.14
Test Receiver	R&S	ESCI	101427	2017.10.15	2018.10.14
Universal Radio Communication Tester	R&S	CMW500	131428	2018.03.11	2019.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2018.11.01
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.10.27	2018.10.26
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	N/A	2018.03.11	2019.03.10
Low frequency cable	EM	R01	N/A	2018.03.11	2019.03.10
Low frequency cable	EM	R06	N/A	2018.03.11	2019.03.10
High frequency cable	SCHWARZBECK	R04	N/A	2018.03.11	2019.03.10
High frequency cable	SCHWARZBECK	R02	N/A	2018.03.11	2019.03.10
Pre-mplifier (0.1M-3GHz)	EM	EM330	60538	2018.03.11	2019.03.10
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14
Band Reject fil- ter(1920-1980MHz)	COM-MW	ZBSF-1920-1980	0092	2017.10.15	2018.10.14
Band Reject fil- ter(880-915MHz)	COM-MW	ZBSF-C897.5-35	707	2017.10.15	2018.10.14
Band Reject fil- ter(1710-1785MHz)	COM-MW	ZBSF-C1747.5-75	708	2017.10.15	2018.10.14
Band Reject fil- ter(1850-1910MHz)	COM-MW	ZBSF-C1880-60	709	2017.10.15	2018.10.14
Band Reject fil- ter(2500-2570MHz)	COM-MW	ZBSF-C2535-70	710	2017.10.15	2018.10.14
Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	2017.10.15	2018.10.14
trun table	EM	SC100_1	60531	N/A	N/A
Antnna mast	EM	SC100	N/A	N/A	N/A

Equipment with a calibration date of "NCR" shown in this list was not used to make direct calibrated measurements.



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5 TEST ITEMS 5.1 CONDUCTED OUTPUT POWER

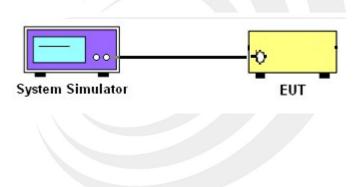
Test overview

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

Test procedures

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

Test setup



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5.2 PEAK TO AVERAGE RATIO

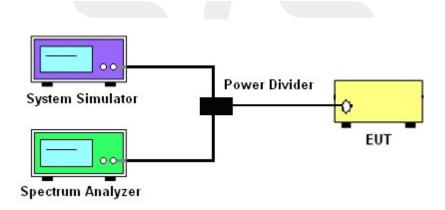
TEST OVERVIEW

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 db.

TEST PROCEDURES

- 1. The testing follows fcckdb 971168 v03r01 section
- 2. The eut was connected to the and peak and av system simulator& spectrum analysis reads
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Set the test probe and measure average power of the spectrum analysis

TEST SETUP



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5.3 TRANSMITTER RADIATED POWER (EIRP/ERP)

TEST OVERVIEW

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26 2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

TEST PROCEDURE

1. The testing follows FCC KDB 971168 D01 Section 5.2.2 (for GSM) and ANSI C63.26-2015 Section 5.2.

2. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

3. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

4. The frequency range up to tenth harmonic of the fundamental frequency was investigated.

5. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a nonradiating cable. The absolute levels of the spurious emissions were measured by the substitution.

6. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26-2015. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP/ERP was calculated with the correction factor,

ERP/EIRP = P.SG + GT - LC

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMe as, typically dBW or dBm);

PMeas(PK) = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

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5.4 OCCUPIED BANDWIDTH

TEST OVERVIEW

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

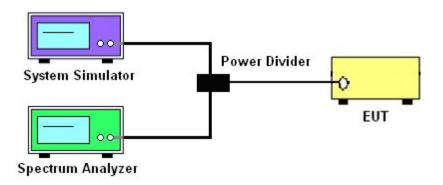
All modes of operation were investigated and the worst case configuration results are reported in this section.

TEST PROCEDURE

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.

- 2. RBW = 1 5% of the expected OBW
- 3. VBW ≥ 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
- 1-5% of the 99% occupied bandwidth observed in Step 7

TEST SETUP



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5.5 FREQUENCY STABILITY Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26 2015. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure

Temperature Variation

1. The testing follows fcckdb 971168 D01 section 9.0

2. The EUT was set up in the thermal chamber and connected with the system simulator.

3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing.

Power was applied and the maximum change in frequency was recorded within one minute.

4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Voltage Variation

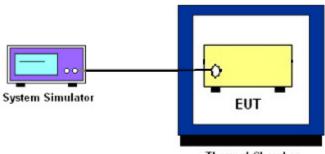
1. The testing follows FCC KDB 971168 D01 Section 9.0.

2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.

3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

4. The variation in frequency was measured for the worst case.

TEST SETUP



Thermal Chamber

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5.6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS Test Overview

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

Test procedure

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26-2015-Section 5.5

2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and

attenuator. The path loss was compensated to the results for each measurement.

4. The middle channel for the highest RF power within the transmitting frequency was measured.

5. The conducted spurious emission for the whole frequency range was taken.

6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

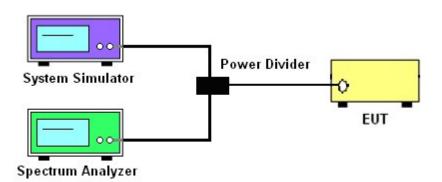
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

Test Setup



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5.7 BAND EDGE

OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

1. The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26-2015-Section 5.7

2. Start and stop frequency were set such that the band edge would be placed in the center of the Plot.

3. The EUT was connected to the spectrum analyzer and system simulator via a power divider.

4. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator.

The path loss was compensated to the results for each measurement.

5. The band edges of low and high channels for the highest RF powers were measured.

6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

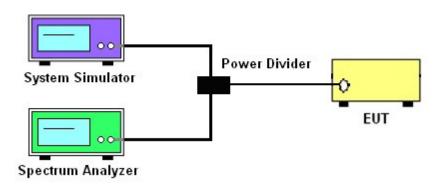
7.The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP







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5.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT Test overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signalsoperating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas.Measurements on signals operating above 1GHz are performed using vertically and horizontally polarizedhorn antennas. All measurements are performed as peak measurements while the EUT isoperating at maximum power and at the appropriate frequencies.

EUT isoperating at maximum power and at the appropriate frequencies.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

Test procedure

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26-2015-Section 5.5.

- 2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 3. VBW ≥ 3 x RBW
- 4. Span = 1.5 times the OBW
- 5.No. of sweep points > 2 x span/RBW
- 6. Detector = Peak
- 7. Trace mode = max hold
- 8. The trace was allowed to stabilize

9. Effective Isotropic Spurious Radiation was measured by substitution method according

to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and

then a known power from S.G. was applied into the dipole antenna through a Tx cable, and

then recorded the maximum Analyzer reading through raised and lowered the test antenna.

The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP/ERP was calculated with the correction factor,

ERP/EIRP = P.SG + GT - LC

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, t ypically dBW or dBm);

P.SG = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

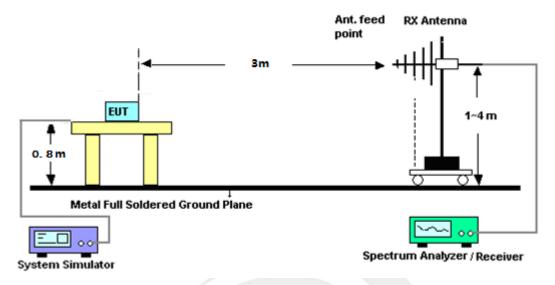
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.



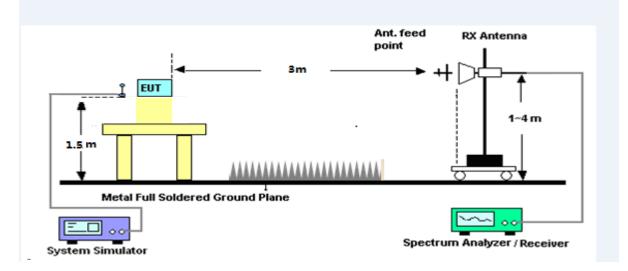
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TEST SETUP

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz





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APPENDIX A.TESTRESULT A1.CONDUCTED OUTPUT POWER

GSM 850:

Mode	Frequency (MHz)	AVG Power(dBm)
	824.2	30.95
GSM	836.6	<mark>31.89</mark>
	848.8	31.44

PCS 1900:

Mode	Frequency (MHz)	AVG Power(dBm)
	1850.2	28.75
GSM	1880.0	<mark>28.8</mark>
	1909.8	28.41



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A2. PEAK-TO-AVERAGE RADIO

Mode	Frequency	PAR
Mode	(MHz)	(dB)
	824.2	0.33
GSM850	836.6	0.36
	848.8	0.35
	1850.2	0.69
PCS1900	1880	0.53
	1909.8	0.55

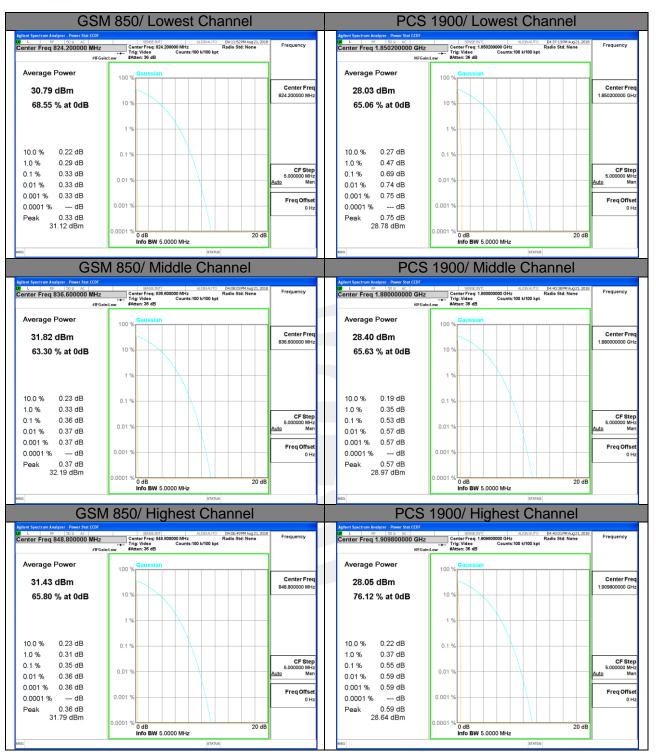


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A3. TRANSMITTER RADIATED POWER (EIRP/ERP)

Radiated Power (ERP) for GSM 850 MHZ										
			Result							
Mode	Frequency	S	Cable	Gain	PMeas	Polarization	Conclusion			
		G.Level (dBm)	loss	(dBi)	E.R.P(dBm)	Of Max. ERP				
	824.2	22.19	0.44	6.5	28.25	Horizontal	Pass			
	824.2	24.18	0.44	6.5	30.24	Vertical	Pass			
COMOLO	836.6	23.26	0.45	6.5	29.31	Horizontal	Pass			
GSM850	836.6	25.23	0.45	6.5	<mark>31.28</mark>	Vertical	Pass			
	848.8	23.07	0.46	6.5	29.11	Horizontal	Pass			
	848.8	24.78	0.46	6.5	30.82	Vertical	Pass			
Limit	E.R.P<7W=	38.45dBm								

		Radiated	Power (EIRP) f	or PCS 1900 MH	ΙZ	
Mode	Frequency	S G. Level (dBm)	Cable loss	Gain (dBi)	PMeas E.I.R.P.(dBm)	Polarization Of Max. EIRP.	Conclusion
	1850.2	18.34	2.41	10.35	26.28	Horizontal	Pass
	1850.2	20.1	2.41	10.35	28.04	Vertical	Pass
PCS1900	1880	18.55	2.42	10.35	26.48	Horizontal	Pass
FC31900	1880	20.36	2.42	10.35	<mark>28.29</mark>	Vertical	Pass
	1909.8	18.24	2.43	10.35	26.16	Horizontal	Pass
	1909.8	20	2.43	10.35	27.92	Vertical	Pass
Limit	E.I.R.P<2W	/=33dBm					

Note:Test is divided into three directions, X/Y/Z. X pattern for the worst.



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A4. OCCUPIED BANDWIDTH (99% OCCUPIED BANDWIDTH/26dB BANDWIDTH)

Occupied Bandwidth for GSM 850 band							
Mode		Occupied Bandwidth	Emission Bandwidth				
Mode	Frequency(MHz)	(99%)(kHz)	(-26dBc)(kHz)				
Low Channel	824.2	247.73	317.0				
Middle Channel	836.6	246.40	323.4				
High Channel	848.8	247.28	318.1				

Occupied Bandwidth for GSM1900 band								
Mode	Frequency(MHz)	Occupied Bandwidth	Emission Bandwidth					
Mode	Frequency(IVIHZ)	(99%)(kHz)	(-26dBc)(kHz)					
Low Channel	1850.2	251.08	318.2					
Middle Channel	1880.0	250.02	312.7					
High Channel	1909.8	243.76	314.8					



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GSM 850 CH 128



GSM 850 CH 190

RL RF 50Ω AC		SENSE:INT Center Freg: 836.60000	ALIGNAUTO	03:51:54PM Aug 21, 20 Radio Std: None
enter Freq 836.600000 N	IHz	Trig: Free Run	NHz Avg Hold>10/10	
	#IFGain:Low	#Atten: 46 dB		Radio Device: BTS
Ref Offset 8.5 dB 0 dB/div Ref 36.00 dBm				
16.0				
6.0		Marine - and	mpr.	
.00	^			
00			he a	
4.0	Augura and and		North March March	9 1 .
4.0	- Arri			and the second s
4.0				
4.0				
1.0				
enter 836.6 MHz				Span 1 Mi
Res BW 10 kHz		#VBW 30 kH	z	Sweep 12.4 n
Occupied Bandwidth	n			
	46.40 kHz			
Transmit Freq Error	595 Hz	OBW Power	99.00 %	
x dB Bandwidth	323.4 kHz	x dB	-26.00 dB	



GSM 850 CH 251

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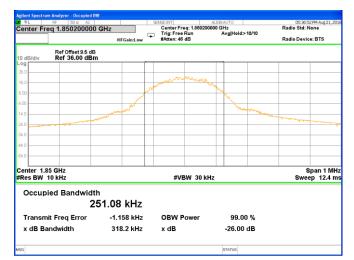
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PCS 1900 CH 512



PCS 1900 CH 661

gilent Spectrum Analyzer - Occupied BW RL RF 50.0 AC		SENSE:INT	ALIGNAUTO	05:38:58PM Aug 21, 2
Center Freq 1.880000000	GHz	Center Freg: 1.8800000	000 GHz	Radio Std: None
		Trig: Free Run #Atten: 46 dB	Avg Hold>10/10	Radio Device: BTS
	#IFGaIn:Low	Readent 40 GD		Radio Device. D15
Ref Offset 9.5 dB dB/div Ref 36.00 dBm				
ng Rei 30.00 dBin				
6.0				
5.0		amma		
00		and the second s	1	
00				
1.0	wast		mon marine	
1.0	mar.			
.0				
1.0				
enter 1.88 GHz				Span 1 M
Res BW 10 kHz		#VBW 30 kH	z	Sweep 12.4
Occupied Bandwidth	1			
25	50.02 kHz			
Transmit From Error	723 Hz	OBW Power	00.00 %	
Transmit Freq Error			99.00 %	
x dB Bandwidth	312.7 kHz	x dB	-26.00 dB	
a			STATUS	

PCS 1900 CH 810

RL RF 50Ω AC		SENSE:INT	ALIGN AUTO	05:41:24PM Aug 21, 20
Center Freq 1.909800000	GHz	Center Freq: 1.9098000 Trig: Free Run	00 GHz Avg Hold>10/10	Radio Std: None
	#IFGain:Low	 Trig: Free Run #Atten: 46 dB 	Avg Hold>10/10	Radio Device: BTS
Ref Offset 9.5 dB 0 dB/div Ref 36.00 dBm				
26.0				
6.0		mon man		
00		de la	my	
.00			- M	
1.0	and the second		Jum	
1.0	and a second		~~~~	
1.0				
1.0				
enter 1.91 GHz Res BW 10 kHz		#VBW 30 kH		Span 1 Mi Sweep 12.4 r
Res BW 10 KHZ		#VBW JUKH	Z	Sweep 12.4 n
Occupied Bandwidth				
24	3.76 kHz			
Transmit Freq Error	578 Hz	OBW Power	99.00 %	
x dB Bandwidth	314.8 kHz	x dB	-26.00 dB	
			STATUS	

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A5.FREQUENCY STABILITY

Normal Voltage = 3.7V. ; Battery End Point (BEP) = 3.4V.; Maximum Voltage = 4.2V

	GSM	850 Middle Char	nnel/836.6MHz		
Temperature	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
(°C)	(Volt)	(Hz)	(ppm)		
50		18.70	0.022		
40		18.89	0.023		
30		15.74	0.019		
20		31.88	0.038		
10	Normal Voltage	16.11	0.019		
0		23.93	0.029	2.5ppm	PASS
-10		19.17	0.023		
-20	/	26.01	0.031		
-30		19.87	0.024		
25	Maximum Voltage	16.49	0.020		
25	BEP	17.25	0.021		

	GSM ²	1900 Middle Cha	nnel/1880MHz		
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50		19.79	0.011		
40		15.53	0.008		
30		24.85	0.013		
20	_	15.07	0.008		
10	Normal Voltage	14.48	0.008	Within Au-	
0	_	23.56	0.013	thorized	PASS
-10		25.08	0.013	Band	
-20	_	26.06	0.014		
-30		20.44	0.011		
25	Maximum Voltage	22.93	0.012		
25	BEP	20.83	0.011		

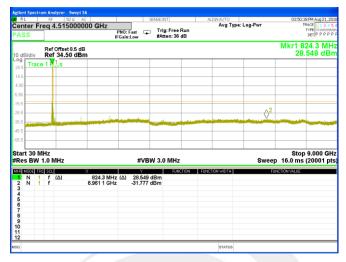


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A6. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

GSM 850 BAND

Lowest Channel



Middle Channel

			Analyzer - S	ment EA							-
R				8 AC		SENSE: IN	T	ALIGNAUTO		03-52-2	3PM Aug 21, 3
Cen PAS				000000 GHz	PNO: Fast FGain:Low	Trig	: Free Run en: 36 dB		pe:Log-Pwr	17	TYPE MWWW DET P P P F
0 di	3/div		tef Offset 8 tef 34.50							Mkr1 8 29.	36.9 M 343 dE
og 24.5	Tra	ice 1	1_s								
4.5											
50											
5.5											
5.5											2
5.5				والقريم والمراجع		lained				Yuman	
5.5	-										
5.5											
		MH N 1.	z D MHz		:	#VBW 3.0	MHz		Swee	Stop p 16.0 ms	9.000 C (20001
		TRC		×		Y	FUNCTION	FUNCTION WIDTH		UNCTION VALUE	
1 2 3 4	N	1	f (Δ) f	836.9 MHz 8.003 0 GHz	(Δ) 29-30	.343 dBm .954 dBm					
5 6 7											
8 9 0 1 2											
id id		-						STATUS			

Highest Channel

ASS	eq 4.51500 Ref Offset 8.8 Ref 34.50 a 1 P 1.s	IF 5 dB	Gain:Low	Trig: Free Run #Atten: 36 dB	Avg	Type: Log-Pwr	Mkr1 8	TRACE 12345 TYPE MANAGE 12345 TYPE MANAGE 12345 DET P P P P P B49.0 MH 3.644 dBr
9 Trace 4.5 .50 5.5	Ref 34.50							
4.5 Trace 4.5	9 1 P(1s							
4.5 1.50 .50 5.5								
5.5								
5.5								
5.5								-
5.5		والمراجع والمراجع والمراجع	an a				and the second	No. of Concession, Name
5.5								
5.5								
tart 30 M Res BW 1			#VBW	3.0 MHz		Swe	Sto eep 16.0 ms	p 9.000 GH s (20001 pt
Ke Mode Tri 1 N 1 2 N 1	f (Δ)	× 849.0 MHz 7.507 8 GHz	(Δ) 28.644 d -31.299 d	EUNCTION Bm Bm	FUNCTION WIDT	H	FUNCTION VALUE	
3 4								
5								
7								
8 9								
0								
2								

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GSM1900 BAND(30M-20G)

Lowest Channel

Agilent Spect								
M RL		50 Ω AC	s	ENSE:INT	ALIGNAUTO Avg Type:	Les Dur	05:37:	24PM Aug 21, 201
PASS	req 10.0		PNO: Fast 😱 FGain:Low	Trig: Free Run #Atten: 36 dB	Avg Type.	Log-Pwr		TYPE MWAMAAAA DET P P P P P
10 dB/div	Ref Offse Ref 34.							50 3 GH 916 dBn
Log 24.9 Trac	e 1 🚺 s							
14.9								
-5.08								
-15.1							aggregation 2	a facility a
-35.1	and see	and the second second		wine and the state				
-45.1								
Start 30 M #Res BW			#VBV	V 3.0 MHz		Swe	Stop sep 50.7 ms	20.000 GHz (40001 pts
MKR MODE T	RE SCL f (Δ)	× 1.850 3 GHz	(Δ) 24.916 c	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	
2 N 1 3	f	16.475 8 GHz	-25.325 c	iBm				
4 5 6 7								
7 8 9								
10								
12 MSG					STATUS			
					UTHIOD			

Middle Channel

RL	um Analyzer - Sw RF 50 s	AC I	SENSE	SINT	ALIGNAUTO		05:3	9:30PM Aug 21, 2
		000000 GHz	PNO: East T	rig: Free Run Atten: 36 dB		rpe: Log-Pwr		TRACE 1 2 3 4 TYPE MWMM DET P P P P
dB/div	Ref Offset 9. Ref 33.26							880 2 G 3.259 dE
Trace	e 1 K <u>21</u> s							
.3							-	_
26	_							
4								
.7							\Diamond^2	
7	James and and	And I				No. of Concession, Name	ميران المناس	-
7								
7								
art 30 M es BW	1HZ 1.0 MHZ		#VBW 3	.0 MHz		Swe	Stop ep 50.7 m	s (40001)
R MODE TR		×	Y	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	
N 1	f (Δ) f	1.880 2 GHz 16.373 4 GHz	(Δ) 23.259 dBn -25.221 dBn					
1								
,] 								

Highest Channel

		ectru		alyzer - Sv										
	rke	r 1 ′	RF 1.91		2 AC 500000 GH	Z	East C	Trig: Free	Run	ALIGN		pe: Log-Pwr	05:46	30PM Aug 21, 2018 TRACE 1 2 3 4 5 1 TYPE MWWWWW
PA	SS					IFGai	n:Low	#Atten: 36	dB					DETPPPP
	dB/di	iv		Offset 9 7 32.40									Mkr1 1.9 22	910 2 GHz 2.398 dBm
Log 22.		race	1 P	1,										
12.	· I · · ·		_											
2.4	0													_
-7.6			_											
-17.8	6												\Diamond^2	
-27.8											مالارمان		and the second second	
-37.8	· · · · ·													
-47.8 -57.8														
	Ľ													
	es B			MHz			#VB	W 3.0 MH	z			Swe	Stop ep 50.7 ms	20.000 GHz 6 (40001 pts
	MOD	e tro			×		Y		ICTION	FUNCTION	WIDTH		FUNCTION VALUE	
1	N	1	f	(Δ)	1.910 2 16.486 3	GHz (A) GHz	22.398	dBm dBm						
2 3 4 5 6 7 8 9 10														
5														
7														
9														
11 12														
12 MSG		-									STATUS			
											0111100			

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GSM 850

Lowest Band Edge



Highest Band Edge



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Report No.: STS1808137W01

GSM 1900

Lowest Band Edge



Highest Band Edge



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A8. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT GSM 850: (30-9000)MHz

GSM 850: (30-9000)MHz											
The Worst Test Results Channel 128/824.2 MHz											
S G.Lev			PMea	Limit	Margin	Polarity					
(dBm)	Апцаві)	LUSS	(dBm)	(dBm)	(dB)						
-41.21	9.40	4.75	-36.56	-13.00	-23.56	Н					
-39.39	10.60	8.39	-37.18	-13.00	-24.18	Н					
-31.33	12.00	11.79	<mark>-31.12</mark>	-13.00	-18.12	Н					
-44.04	9.40	4.75	-39.39	-13.00	-26.39	V					
-44.99	10.60	8.39	-42.78	-13.00	-29.78	V					
-43.76	12.00	11.79	-43.55	-13.00	-30.55	V					
The Wo	rst Test R	esults Ch	annel 190	/836.6 MHz							
S G.Lev	Ant(dBi)		PMea	Limit	Margin	Polarity					
(dBm)	Ani(ubi)	L055	(dBm)	(dBm)	(dB)						
-41.38	9.50	4.76	-36.64	-13.00	-23.64	Н					
-39.85	10.70	8.40	-37.55	-13.00	-24.55	Н					
-31.57	12.20	11.80	<mark>-31.17</mark>	-13.00	-18.17	Н					
-43.75	9.40	4.75	-39.10	-13.00	-26.10	V					
-44.06	10.60	8.39	-41.85	-13.00	-28.85	V					
-43.69	12.20	11.82	-43.31	-13.00	-30.31	V					
The Wo	rst Test R	esults Ch	annel 251	/848.8 MHz							
cy(MHz) S G.Lev	Ant(dBi)		PMea	Limit	Margin	Polarity					
(dBm)	Апцаві)	L035	(dBm)	(dBm)	(dB)	Folanty					
-40.40	9.60	4.77	-35.57	-13.00	-22.57	Н					
-40.50	10.80	8.50	-38.20	-13.00	-25.20	Н					
-32.22	12.50	11.90	<mark>-31.62</mark>	-13.00	-18.62	Н					
-43.92	9.60	4.77	-39.09	-13.00	-26.09	V					
-44.35	10.80	8.50	-42.05	-13.00	-29.05	V					
-43.62	12.50	11.90	-43.02	-13.00	-30.02	V					
	S G.Lev (dBm) -41.21 -39.39 -31.33 -44.04 -44.99 -43.76 The Wo S G.Lev (dBm) -41.38 -39.85 -31.57 -43.75 -43.75 -43.69 The Wo S G.Lev (dBm) -40.40 -40.50 -40.50 -32.22 -43.92	Test Reference of the Wortstrest Reference	The Worst Test Results Character (dBm) S G.Lev (dBm) Ant(dBi) Loss -41.21 9.40 4.75 -39.39 10.60 8.39 -31.33 12.00 11.79 -44.04 9.40 4.75 -44.04 9.40 4.75 -44.04 9.40 4.75 -44.99 10.60 8.39 -43.76 12.00 11.79 S G.Lev (dBm) Ant(dBi) Alloss (dBm) Ant(dBi) 4.76 -39.85 10.70 8.40 -31.57 12.20 11.80 -31.57 12.20 11.80 -31.57 12.20 11.80 -43.75 9.40 4.75 -44.06 10.60 8.39 -43.69 12.20 11.80 -43.69 12.20 11.82 S G.Lev (dBm) Ant(dBi) 8.50 -40.40 9.60 4.77 -40.40 9.60 4.77 -40.50 10.80 8.50 -32.22 <td>S.G.Lev (dBm) Ant(dBi) Loss PMea (dBm) -41.21 9.40 4.75 -36.56 -39.39 10.60 8.39 -37.18 -31.33 12.00 11.79 -31.12 -44.04 9.40 4.75 -39.39 -44.04 9.40 4.75 -39.39 -44.04 9.40 4.75 -39.39 -44.99 10.60 8.39 -42.78 -43.76 12.00 11.79 -43.55 The Workst Test Results Charge -43.55 -43.55 S.G.Lev Ant(dBi) Loss PMea (dBm) -12.20 11.80 -31.17 -41.38 9.50 4.76 -39.10 -41.35 10.70 8.40 -37.55 -31.57 12.20 11.80 -31.17 -43.75 9.40 4.75 -39.10 -44.06 10.60 8.39 -41.85 (dBm) 12.20 11.82 -43.31</td> <td>The Work Test Results Charactering 128/24.2 MHz S G.Lev (dBm) Ant(dBi) Loss (dBm) PMea (dBm) Limit (dBm) -41.21 9.40 4.75 -36.56 -13.00 -39.39 10.60 8.39 -37.18 -13.00 -31.33 12.00 11.79 -31.12 -13.00 -44.04 9.40 4.75 -39.39 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -43.76 12.00 11.79 -43.55 -13.00 -43.75 9.40 4.76 -36.64 13.00 -39.85 10.70 8.40 -37.55 -13.00 -41.38 9.50 4.76 -39.10 -13.00 -43.69 12.20 11.80 -41.85 -13.00</td> <td>Network test test test test test test test tes</td>	S.G.Lev (dBm) Ant(dBi) Loss PMea (dBm) -41.21 9.40 4.75 -36.56 -39.39 10.60 8.39 -37.18 -31.33 12.00 11.79 -31.12 -44.04 9.40 4.75 -39.39 -44.04 9.40 4.75 -39.39 -44.04 9.40 4.75 -39.39 -44.99 10.60 8.39 -42.78 -43.76 12.00 11.79 -43.55 The Workst Test Results Charge -43.55 -43.55 S.G.Lev Ant(dBi) Loss PMea (dBm) -12.20 11.80 -31.17 -41.38 9.50 4.76 -39.10 -41.35 10.70 8.40 -37.55 -31.57 12.20 11.80 -31.17 -43.75 9.40 4.75 -39.10 -44.06 10.60 8.39 -41.85 (dBm) 12.20 11.82 -43.31	The Work Test Results Charactering 128/24.2 MHz S G.Lev (dBm) Ant(dBi) Loss (dBm) PMea (dBm) Limit (dBm) -41.21 9.40 4.75 -36.56 -13.00 -39.39 10.60 8.39 -37.18 -13.00 -31.33 12.00 11.79 -31.12 -13.00 -44.04 9.40 4.75 -39.39 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -44.99 10.60 8.39 -42.78 -13.00 -43.76 12.00 11.79 -43.55 -13.00 -43.75 9.40 4.76 -36.64 13.00 -39.85 10.70 8.40 -37.55 -13.00 -41.38 9.50 4.76 -39.10 -13.00 -43.69 12.20 11.80 -41.85 -13.00	Network test test test test test test test tes					

Note: (1) Below 30MHz no Spurious found is the worst condition.

(2) Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value

(3)Test is divided into three directions, X/Y/Z. X pattern for the worst.



PCS 1900: (30-20000)MHz

DCS 1900: (30-20000)MHz											
The Worst Test Results for Channel 512/1850.2MHz											
	S G.Lev		nt(dBi) Loss	PMea	Limit	Margin	Delerity				
Frequency(MHz)	(dBm)	Ant(dBI)		(dBm)	(dBm)	(dB)	Polarity				
3700.34	-34.79	12.60	12.93	-35.12	-13.00	-22.12	Н				
5550.38	-35.06	13.10	17.11	-39.07	-13.00	-26.07	Н				
7400.69	-33.61	11.50	22.20	-44.31	-13.00	-31.31	Н				
3700.51	-34.70	12.60	12.93	<mark>-35.03</mark>	-13.00	-22.03	V				
5550.31	-34.71	13.10	17.11	-38.72	-13.00	-25.72	V				
7400.55	-32.27	11.50	22.20	-42.97	-13.00	-29.97	V				
	The Wors	t Test Res	ults for C	hannel 66	1/1880.0MH	lz					
Frequency(MHz)	S G.Lev	Apt(dDi)		PMea	Limit	Margin	Delority				
Frequency(IVIEZ)	(dBm)	Ant(dBi)	Loss	(dBm)	(dBm)	(dB)	Polarity				
3760.00	-34.58	12.60	12.93	<mark>-34.91</mark>	-13.00	-21.91	Н				
5640.18	-35.26	13.10	17.11	-39.27	-13.00	-26.27	Н				
7520.06	-32.95	11.50	22.20	-43.65	-13.00	-30.65	Н				
3760.06	-36.00	12.60	12.93	-36.33	-13.00	-23.33	V				
5640.33	-33.91	13.10	17.11	-37.92	-13.00	-24.92	V				
7519.90	-32.37	11.50	22.20	-43.07	-13.00	-30.07	V				
	The Wors	t Test Res	ults for C	hannel 81	0/1909.8MH	Ηz					
	S G.Lev	Apt(dBi)	Loss	PMea	Limit	Margin	Delerity				
Frequency(MHz)	(dBm)	Ant(dBi)	LUSS	(dBm)	(dBm)	(dB)	Polarity				
3819.57	-34.27	12.60	12.93	<mark>-34.60</mark>	-13.00	-21.60	Н				
5729.35	-35.11	13.10	17.11	-39.12	-13.00	-26.12	Н				
7638.87	-33.65	11.50	22.20	-44.35	-13.00	-31.35	Н				
3819.44	-35.28	12.60	12.93	-35.61	-13.00	-22.61	V				
5729.32	-33.98	13.10	17.11	-37.99	-13.00	-24.99	V				
7639.06	-32.69	11.50	22.20	-43.39	-13.00	-30.39	V				

Note: (1) Below 30MHz no Spurious found is the worst condition.

(2) Above 8GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value

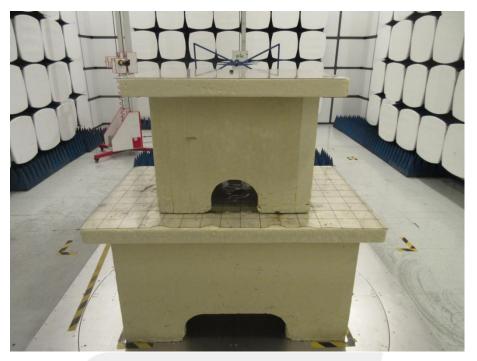
(3)Test is divided into three directions, X/Y/Z. X pattern for the worst.

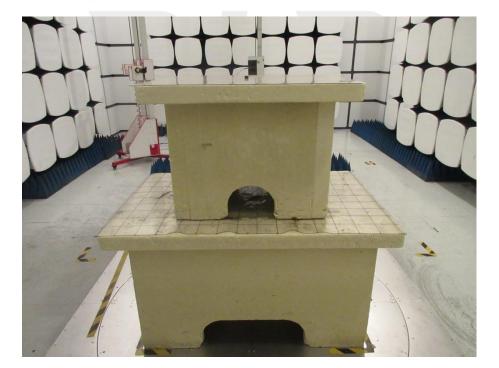


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APPENDIX BPHOTOS OF TEST SETUP

RADIATED SPURIOUS EMISSION





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