




TEST REPORT
FCC ID: SY4-A01010
For

Shanghai Huace Navigation Technology LTD.
GNSS Receiver

Model No. : i70, iG8

Trade name : The logo for CHC, consisting of a stylized globe icon in blue and yellow, followed by the letters 'CHC' in a bold, blue, sans-serif font.

Prepared for : Shanghai Huace Navigation Technology LTD.
Address : Building C,599 Gaojing Road,Qingpu District,Shanghai,China

Prepared by : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building B, East Area of Nanchang Second, Industrial Zone,
Gushu 2nd Road, Bao'an, Shenzhen, China

Report No. : T1871060 03

Date of Receipt : June 22, 2017


Date of Test : June 22, 2017- July 11, 2017

Date of Report : July 11, 2017

TABLE OF CONTENTS

Description	Page
1. Summary of Standards And Results	4
1.1 Description of Standards and Results	4
2. General Information	6
2.1 Description of Device (EUT)	6
2.2 Accessories of Device (EUT)	7
2.3 Tested Supporting System Details.....	7
2.4 Test Mode Description	7
2.5 Test Conditions.....	8
2.6 Test Facility	8
2.7 Measurement Uncertainty	8
2.8 Test Equipment List	9
3. Radiated Power and Effective Isotropic Radiated Power	10
3.1 Measurement Method	10
3.2 Test Setup	10
3.3 Test Procedures	11
3.4 Test Results	11
4. Radiated Spurious Emission.....	14
4.1 Measurement Method	14
4.2 Test Setup	14
4.3 Test Procedures	15
4.4 Test Results	16

DECLARATION

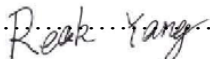
Applicant : Shanghai Huace Navigation Technology LTD.
 Manufacturer : Shanghai Huace Navigation Technology LTD.
 EUT Description : GNSS Receiver
 (A) Model No. : i70, iG8
 (B) Trademark : 
 (C) Ratings Supply : DC 15V from adapter input 120V/60Hz


Measurement Standard Used:

FCC Part 22H, Part 24E, Part 27, part 90, ANSI/TIA-603-E: 2016

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Reak Yang
 Project Engineer 

Approved by (name + signature).....: Simple Guan
 Project Manager 

Date of issue.....: July 11, 2017

1. SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results


The EUT have been tested according to the applicable standards as referenced below:

FCC Part2, 22E, 24H EMISSION		
Test Description	Standard Paragraph	Test Result
Conducted Output Power	§2.1049	Compliance*
Peak-to-Average Ratio	§2.0146, §24.232	Compliance*
Effective Radiated Power/Equivalent Isotropic Radiated Power	§2.1046, §22.913, §24.232	Compliance
Occupied Bandwidth	§2.1049, §22.917, §24.238	Compliance*
Frequency Stability	§2.1055, §22.355, §24.235	Compliance*
Spurious Emission at Antenna Terminals	§2.1051, §22.917, §24.238	Compliance*
Field Strength of Spurious Radiation	§2.1053, §22.917, §24.238	Compliance
Band Edge	§2.1051, §22.917, §24.238	Compliance*
FCC Part2, 22E, 24H, 27 EMISSION		
Description of Test Item	Standard Paragraph	Results
Maximum permissible exposure(MPE)	§1.1307, §2.1091	Compliance
ERP&EIRP	§2.1046, §22.913(a) §24.232(c), §27.50(d)	Compliance
Modulation Characteristics	§2.1047	Compliance*
Occupied Bandwidth	§2.1049, §22.905, §22.917, §24.238, §27.53(c)	Compliance*
Spurious Emissions at Antenna Terminal	§2.1051, §22.917(a), §24.238(a), §27.53(c)(h)	Compliance*
Spurious Radiated Emissions	§2.1053, §22.917(a), §24.238(a), §27.53(c)(h)	Compliance
Band Edge	§22.917(a), §24.238(a) §27.53(c)(h)	Compliance*
Frequency Stability	§2.1055, §22.355, §24.235, §27.54	Compliance*
<p>Compliance*: The EUT has the 2G/3G module. The module had been certified which the model number is HE910, FCC ID: RI7HE910. The EUT use the module series model: HE910-D. The difference between the module which is used in the EUT and the original 2G/3G module is changed the antenna, so we added the test for ERP&EIRP, Spurious Radiated Emissions and the assessment for MPE, we pre-scan the output power, the output power is similar as the power in the original report. Radiated emission has been re-tested and the result for conducted test was cited from the certified module directly. The other data are refer to the report 1112FR12-02 which the model: HE910 (FCC ID: RI7HE910).</p>		

FCC Part2, part90 EMISSION		
Description of Test Item	Standard Paragraph	Results
RF output power	§ 2.1046; §90.205	Compliance*
Ocupied bandwidth & emission mask	§ 2.1049; §90.209; §90.210	Compliance*
Spurious emissions at antenna terminals	§ 2.1051; §90.210	Compliance*
Radiated spurious emissions	§ 2.1053; §90.210	Compliance
Frequency stability	§2.1055; §90.213	Compliance*
<p>Compliance*: The EUT has the Radio module. The module had been certified which the model number is SATEL-TA23, FCC ID: MRBSATEL-TA23. The difference between the module which is used in the EUT changed the antenna, so we added the test for ERP&EIRP, Spurious Radiated Emissions and the assessment for MPE, we pre-scan the output power, the output power is similar as the power in the original report. Radiated emission has been re-tested and the result for conducted test was cited from the certified module directly. The other data are refer to the report 281080-1 which the model: SATEL-T23 (FCC ID: MRBSATEL-TA23).</p>		

2. GENERAL INFORMATION

2.1 Description of Device (EUT)

Trademark	:	
Description	:	GNSS Receiver
Model Number	:	i70, iG8
Diff	:	All the models are the same, except the model name, this report performs the model i70.
		GPRS/EDGE:850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8 MHz
TX frequency	:	WCDMA: Band V: 826.4 MHz ~ 846.6 MHz Band II: 1852.4 MHz ~ 1907.6 MHz Band IV: 1712.4~1752.6MHz UHF: 406.1-430.0 MHz and 450.0-470.0 MHz GPRS/EDGE: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz
RX frequency	:	WCDMA: Band V: 871.4 MHz ~ 891.6 MHz Band II: 1932.4 MHz ~ 1987.6 MHz Band IV: 2112.4MHz ~ 2152.6MHz GPRS for GMSK EGPRS for 8PSK
Modulation type	:	WCDMA: QPSK&16QAM UHF: 4FSK, 8FSK,16FSK
Antenna Type	:	2G/3G: PIFA antenna UHF: Rod antenna GSM 850: 2dBi GSM1900: 1.5dBi
Antenna Peak Gain	:	WCDMA Band V: 0.5dBi Band II: 0dBi Band IV: 0dBi UHF: 1.5dBi
GPRS Class	:	12
Software version	:	V1.3
Hardware version	:	V1.0
Applicant	:	Shanghai Huace Navigation Technology LTD.
Address	:	Building C, 599 Gaojing Road, Qingpu District, Shanghai, China
Manufacturer	:	Shanghai Huace Navigation Technology LTD.
Address	:	Building C, 599 Gaojing Road, Qingpu District, Shanghai, China
Sample Type	:	Prototype production

2.2 Accessories of Device (EUT)

Power Source	: Input: AC 100-240V Output: DC 12-36V/2A LI-ION battery: 3400mAh/7.4V*2
USB Cable	: USB port to PC 1.5m
Data Cable	: IO port to PC with RS-232/external power 1.8m

2.3 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Notebook	ACER	ZQT	N/A	DOC

2.4 Test Mode Description

ALPHA has verified the construction and function in typical operation. EUT is inlink mode with base station emulator at maximum power level. All the test modes were carried out with the EUT in normal operation, which was shown in this test report is the worst test mode and defined as:

BAND	TEST MODES	
	RADIATED TCS	CONDUCTED TCS
GSM 850	GPRS/EDGE CLASS 12 LINK	GPRS/EDGE CLASS 12 LINK
GSM 1900	GPRS/EDGE CLASS 12 LINK	GPRS/EDGE CLASS 12 LINK
WCDMA BAND V	RMC 12.2KBPS LINK	RMC 12.2KBPS LINK
WCDMA BAND II	RMC 12.2KBPS LINK	RMC 12.2KBPS LINK
WCDMA BAND IV	RMC 12.2KBPS LINK	RMC 12.2KBPS LINK
UHF	428.0MHz	428.0MHz

Note:

1. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. The maximum power levels are GPRS multi-slot class 12 for GMSK link, EGPRS multi-slot class 12 mode for 8PSK link, RMC 12.2Kbps mode for WCDMA band V, II and IV, when power supply was 12V, only these modes were used for all tests.
3. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst (Z axis) result on this report.

2.5 Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	27°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	980kPa

2.6 Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road,
Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission

Registration Number: 203110

July 18, 2014 Certificated by IC

Registration Number: 12135A

2.7 Measurement Uncertainty

(95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.71dB
Uncertainty for Radiation Emission test (<1G)	3.90 dB (Distance: 3m Polarize: V)
	3.92 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test (>1G)	4.26 dB (Distance: 3m Polarize: V)
	4.28 dB (Distance: 3m Polarize: H)
Uncertainty for conducted RF Power	0.16dB

2.8 Test Equipment List

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due day
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2016.09.30	2017.09.29
Test Receiver	R&S	ESCI	101165	2016.09.29	2017.09.28
Spectrum analyzer	Agilent	E4407B	MY49510055	2016.09.29	2017.09.28
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2016.09.30	2017.09.29
Filter	KANGMAI	ZLPF-LDC-1000- 1959	1209002075	2016.09.29	2017.09.28
Filter	WAINWRIGHT	WHKX2.80/18G- 12SS	SN1	2016.09.29	2017.09.28
RF Cable	Resenberger	Cable 4	N/A	2016.09.29	2017.09.28
CMU200	R&S	CMU200	116785	2016.09.29	2017.09.28
Signal Analyzer	Agilent	N9020A	MY499100060	2016.09.29	2017.09.28
vector Signal Generator	Agilent	N5182A	MY49060042	2016.09.29	2017.09.28
vector Signal Generator	Agilent	E4438C	US44271917	2016.09.29	2017.09.28
Amplifier	HP	HP8347A	2834A00455	2016.09.29	2017.09.28
Amplifier	Teseq	LNA6901	72718	2016.09.29	2017.09.28
Amplifier	Agilent	8449B	3008A02664	2016.09.29	2017.09.28
Filter	WAINWRIGHT	WHKX1.0G/15G- 10SS	SN40	2016.09.29	2017.09.28
Test Receiver	R&S	ESR	1316.3003K03-1 02082-Wa	2016.09.29	2017.09.28
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2016.09.29	2017.09.28
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2016.7.21	2017.7.20
RF Cable	Resenberger	Cable 1	N/A	2016.09.29	2017.09.28
RF Cable	Resenberger	Cable 2	N/A	2016.09.29	2017.09.28
RF Cable	Resenberger	Cable 3	N/A	2016.09.29	2017.09.28
Power Sensor	Power Radio	RPR3006W	15100041SNO91	2016.09.29	2017.09.28
Power Sensor	Power Radio	RPR3006W	15100041SNO92	2016.09.29	2017.09.28
CMW500	R&S	CMW500	1201.0002K50-1 17239-sM	2016.09.29	2017.09.28
Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2016.09.29	2017.09.28
POWER DIVIDER	Mini-circuits	PD-2SF-0010	N/A	2016.09.29	2017.09.28
POWER DIVIDER	Mini-circuits	PD-2SF-0010	N/A	2016.09.29	2017.09.28

3. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

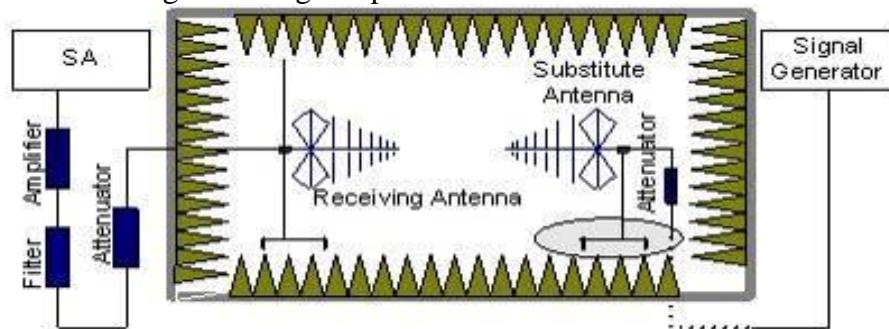
3.1 Measurement Method

Effective radiated power output measurements by substitution method according to ANSI / TIA /EIA-603-E, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems. Mobile and portable (hand-held) stations operating are limited to average ERP, Equivalent isotropic radiated power output measurements by substitution method according to ANSI /TIA / EIA-603-E, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas ,Mobile and portable (hand-held) stations operating are limited to average EIRP.

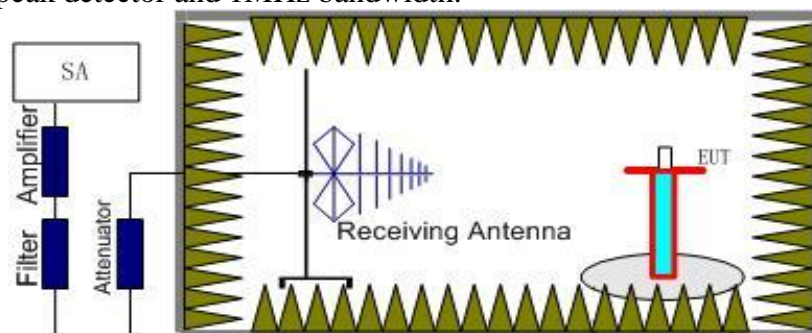
3.2 Test Setup

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = R_x \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$
The SA is calibrated using following setup.



b) EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the

significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:

$$\text{Power} = \text{PMea} + \text{ARpl}$$

3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.6. and ANSI / TIA-603-E-2010 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 1.5 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with Peak detector.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-E. The EUT was replaced by dipole antenna (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 was calculated with the correction factor, $\text{EIRP} = \text{LVL} + \text{Correction factor}$ and $\text{ERP} = \text{EIRP} - 2.15$.
5. RB Set greater than bandwidth, Vb Set spectrum analyzer Maximum support.

3.4 Test Results

Radiated Power (ERP) for UHF							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.R.P (dBm)	Polarization	
UHF	408.0	23.11	0.35	6.2	29.66	Horizontal	Pass
	408.0	23.32	0.35	6.2	29.87	Vertical	Pass
	428.0	23.50	0.36	6.2	30.06	Horizontal	Pass
	428.0	23.71	0.36	6.2	30.27	Vertical	Pass
	468.0	23.24	0.37	6.2	29.81	Horizontal	Pass
	468.0	23.39	0.37	6.2	29.96	Vertical	Pass

Radiated Power (ERP) for GSM 850 MHZ							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.R.P (dBm)	Polarization	
GPRS850	824.2	22.81	0.44	6.5	28.87	Horizontal	Pass
	824.2	24.39	0.44	6.5	30.45	Vertical	Pass
	836.6	22.77	0.45	6.5	28.82	Horizontal	Pass
	836.6	24.74	0.45	6.5	30.79	Vertical	Pass
	848.8	22.76	0.46	6.5	28.80	Horizontal	Pass
	848.8	24.50	0.46	6.5	30.54	Vertical	Pass
EDGE850	824.2	22.80	0.44	6.5	28.86	Horizontal	Pass
	824.2	24.51	0.44	6.5	30.57	Vertical	Pass
	836.6	22.83	0.45	6.5	28.88	Horizontal	Pass
	836.6	24.53	0.45	6.5	30.58	Vertical	Pass
	848.8	22.77	0.46	6.5	28.81	Horizontal	Pass
	848.8	24.51	0.46	6.5	30.55	Vertical	Pass

Radiated Power (EIRP) for PCS 1900 MHZ							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.I.R.P (dBm)	Polarization	
GPRS1900	1850.2	17.75	2.41	10.35	25.69	Horizontal	Pass
	1850.2	19.27	2.41	10.35	27.21	Vertical	Pass
	1880.0	17.9	2.42	10.35	25.83	Horizontal	Pass
	1880.0	19.62	2.42	10.35	27.55	Vertical	Pass
	1909.8	17.76	2.43	10.35	25.68	Horizontal	Pass
	1909.8	19.24	2.43	10.35	27.16	Vertical	Pass
EDGE1900	1850.2	17.79	2.41	10.35	25.73	Horizontal	Pass
	1850.2	19.4	2.41	10.35	27.34	Vertical	Pass
	1880.0	17.88	2.42	10.35	25.81	Horizontal	Pass
	1880.0	19.76	2.42	10.35	27.69	Vertical	Pass
	1909.8	17.67	2.43	10.35	25.59	Horizontal	Pass
	1909.8	19.2	2.43	10.35	27.12	Vertical	Pass

Radiated Power (ERP) for WCDMA Band V							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.R.P (dBm)	Polarization	
Band V	826.4	14.34	0.44	6.5	20.40	Horizontal	Pass
	826.4	16.33	0.44	6.5	22.39	Vertical	Pass
	836.6	14.64	0.45	6.5	20.69	Horizontal	Pass
	836.6	16.38	0.45	6.5	22.43	Vertical	Pass
	846.6	14.56	0.46	6.5	20.60	Horizontal	Pass
	846.6	16.33	0.46	6.5	22.37	Vertical	Pass

Radiated Power (EIRP) for WCDMA Band II							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.I.R.P (dBm)	Polarization	
Band II	1852.4	12.13	2.41	10.35	20.07	Horizontal	Pass
	1852.4	14.09	2.41	10.35	22.03	Vertical	Pass
	1880.0	12.49	2.42	10.35	20.42	Horizontal	Pass
	1880.0	14.19	2.42	10.35	22.12	Vertical	Pass
	1907.6	12.15	2.43	10.35	20.07	Horizontal	Pass
	1907.6	14.13	2.43	10.35	22.05	Vertical	Pass

Radiated Power (EIRP) for WCDMA Band IV							
Mode	Frequency (MHz)	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	E.I.R.P (dBm)	Polarization	
Band IV	1712.4	12.32	2.40	10.35	20.27	Horizontal	Pass
	1712.4	13.49	2.40	10.35	21.44	Vertical	Pass
	1732.4	12.18	2.41	10.35	20.12	Horizontal	Pass
	1732.4	13.55	2.41	10.35	21.49	Vertical	Pass
	1752.5	12.17	2.42	10.35	20.10	Horizontal	Pass
	1752.5	13.83	2.42	10.35	21.76	Vertical	Pass

4. RADIATED SPURIOUS EMISSION

4.1 Measurement Method

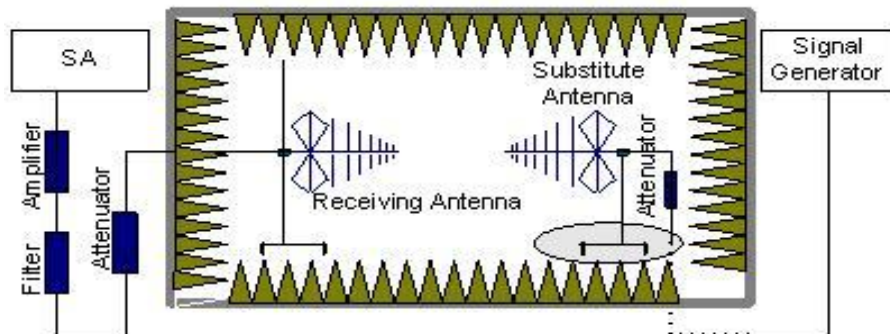
The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-E-2010. The power of any emission outside of the authorized operating frequency ranges

must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. For Band 7 The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB. For Band. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

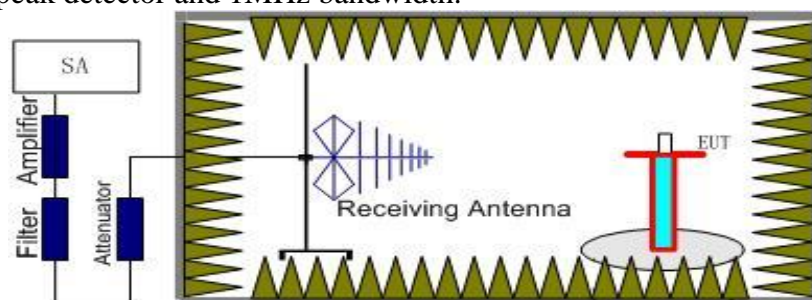
4.2 Test Setup

The procedure of radiated spurious emissions is as follows:

- a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = R_x (\text{dBuV}) + CL (\text{dB}) + SA (\text{dB}) + \text{Gain} (\text{dBi}) - 107 (\text{dBuV to dBm})$
The SA is calibrated using following setup.



- b) EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be

sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:
Power=PMea+ARpl

4.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-E-2010 Section

2.2.12.

2. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.

3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.

4. The table was rotated 360 degrees to determine the position of the highest spurious emission.

5. The height of the receiving antenna is varied between one meter and four meters to search the

maximum spurious emission for both horizontal and vertical polarizations

6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the

record of maximum spurious emission.

7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.

8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

9. Taking the record of output power at antenna port.

10. Repeat step 7 to step 8 for another polarization.

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

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

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}$$

.

For Band 7:

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$

$$= -25\text{dBm}$$

$$\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$$

$$\text{ERP (dBm)} = \text{EIRP} - 2.15$$

4.4 Test Results

GPRS 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dB)	Polarity
1648.21	-41.32	9.40	4.75	-36.67	-13.00	-23.67	H
2472.54	-40.35	10.60	8.39	-38.14	-13.00	-25.14	H
3296.86	-31.97	12.00	11.79	-31.76	-13.00	-18.76	H
1648.09	-43.60	9.40	4.75	-38.95	-13.00	-25.95	V
2472.47	-44.62	10.60	8.39	-42.41	-13.00	-29.41	V
3296.64	-42.73	12.00	11.79	-42.52	-13.00	-29.52	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dB)	Polarity
1673.28	-41.22	9.50	4.76	-36.48	-13.00	-23.48	H
2509.71	-40.54	10.70	8.40	-38.24	-13.00	-25.24	H
3346.37	-31.69	12.20	11.80	-31.29	-13.00	-18.29	H
1672.85	-44.38	9.40	4.75	-39.73	-13.00	-26.73	V
2509.92	-44.55	10.60	8.39	-42.34	-13.00	-29.34	V
3346.23	-42.94	12.20	11.82	-42.56	-13.00	-29.56	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea (dBm)	Limit (dBm)	Margin (dB)	Polarity
1697.63	-41.62	9.60	4.77	-36.79	-13.00	-23.79	H
2546.41	-40.50	10.80	8.50	-38.20	-13.00	-25.20	H
3395.07	-31.82	12.50	11.90	-31.22	-13.00	-18.22	H
1697.60	-44.62	9.60	4.77	-39.79	-13.00	-26.79	V
2546.36	-45.20	10.80	8.50	-42.90	-13.00	-29.90	V
3394.95	-43.87	12.50	11.90	-43.27	-13.00	-30.27	V

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 has.

EGPRS 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1648.14	-41.56	9.40	4.75	-36.91	-13.00	-23.91	H
2472.57	-40.26	10.60	8.39	-38.05	-13.00	-25.05	H
3296.64	-32.31	12.00	11.79	-32.10	-13.00	-19.10	H
1648.05	-44.27	9.40	4.75	-39.62	-13.00	-26.62	V
2472.31	-44.44	10.60	8.39	-42.23	-13.00	-29.23	V
3296.75	-43.66	12.00	11.79	-43.45	-13.00	-30.45	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1672.87	-41.52	9.50	4.76	-36.78	-13.00	-23.78	H
2509.78	-40.35	10.70	8.40	-38.05	-13.00	-25.05	H
3346.17	-32.26	12.20	11.80	-31.86	-13.00	-18.86	H
1673.23	-43.42	9.40	4.75	-38.77	-13.00	-25.77	V
2509.88	-44.93	10.60	8.39	-42.72	-13.00	-29.72	V
3346.37	-42.83	12.20	11.82	-42.45	-13.00	-29.45	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1697.49	-40.63	9.60	4.77	-35.80	-13.00	-22.80	H
2546.44	-40.45	10.80	8.50	-38.15	-13.00	-25.15	H
3395.15	-30.98	12.50	11.90	-30.38	-13.00	-17.38	H
1697.58	-44.22	9.60	4.77	-39.39	-13.00	-26.39	V
2546.44	-44.09	10.80	8.50	-41.79	-13.00	-28.79	V
3395.23	-43.47	12.50	11.90	-42.87	-13.00	-29.87	V

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 has.

GPRS1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3700.49	-34.08	12.60	12.93	-34.41	-13.00	-21.41	H
5550.36	-35.22	13.10	17.11	-39.23	-13.00	-26.23	H
7400.67	-33.65	11.50	22.20	-44.35	-13.00	-31.35	H
3700.51	-35.58	12.60	12.93	-35.91	-13.00	-22.91	V
5550.54	-34.94	13.10	17.11	-38.95	-13.00	-25.95	V
7401.00	-31.89	11.50	22.20	-42.59	-13.00	-29.59	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3759.80	-34.27	12.60	12.93	-34.60	-13.00	-21.60	H
5640.09	-35.19	13.10	17.11	-39.20	-13.00	-26.20	H
7520.10	-33.25	11.50	22.20	-43.95	-13.00	-30.95	H
3760.29	-35.11	12.60	12.93	-35.44	-13.00	-22.44	V
5640.22	-34.01	13.10	17.11	-38.02	-13.00	-25.02	V
7519.91	-31.99	11.50	22.20	-42.69	-13.00	-29.69	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3819.60	-33.82	12.60	12.93	-34.15	-13.00	-21.15	H
5729.29	-34.15	13.10	17.11	-38.16	-13.00	-25.16	H
7639.21	-32.99	11.50	22.20	-43.69	-13.00	-30.69	H
3819.38	-35.47	12.60	12.93	-35.80	-13.00	-22.80	V
5729.53	-35.10	13.10	17.11	-39.11	-13.00	-26.11	V
7639.27	-32.46	11.50	22.20	-43.16	-13.00	-30.16	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 has.

EGPRS 1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3700.19	-33.56	12.60	12.93	-33.89	-13.00	-20.89	H
5550.40	-34.73	13.10	17.11	-38.74	-13.00	-25.74	H
7400.60	-32.31	11.50	22.20	-43.01	-13.00	-30.01	H
3700.51	-35.83	12.60	12.93	-36.16	-13.00	-23.16	V
5550.28	-34.90	13.10	17.11	-38.91	-13.00	-25.91	V
7400.57	-33.19	11.50	22.20	-43.89	-13.00	-30.89	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3760.02	-34.01	12.60	12.93	-34.34	-13.00	-21.34	H
5640.20	-35.38	13.10	17.11	-39.39	-13.00	-26.39	H
7520.11	-32.83	11.50	22.20	-43.53	-13.00	-30.53	H
3759.89	-35.67	12.60	12.93	-36.00	-13.00	-23.00	V
5640.26	-34.13	13.10	17.11	-38.14	-13.00	-25.14	V
7520.22	-31.99	11.50	22.20	-42.69	-13.00	-29.69	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3819.28	-33.80	12.60	12.93	-34.13	-13.00	-21.13	H
5729.18	-35.13	13.10	17.11	-39.14	-13.00	-26.14	H
7639.20	-32.95	11.50	22.20	-43.65	-13.00	-30.65	H
3819.64	-34.60	12.60	12.93	-34.93	-13.00	-21.93	V
5729.32	-34.52	13.10	17.11	-38.53	-13.00	-25.53	V
7639.04	-32.86	11.50	22.20	-43.56	-13.00	-30.56	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 has.

WCDMA Band V: (30-9000)MHz							
The worst testresults channel 4132/826.4MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1652.04	-40.41	9.40	4.75	-35.76	-13.00	-22.76	H
2479.42	-39.54	10.60	8.39	-37.33	-13.00	-24.33	H
3305.62	-30.91	12.00	11.79	-30.70	-13.00	-17.70	H
1652.09	-43.83	9.40	4.75	-39.18	-13.00	-26.18	V
2479.70	-45.13	10.60	8.39	-42.92	-13.00	-29.92	V
3305.47	-42.89	12.00	11.79	-42.68	-13.00	-29.68	V
The Worst Test Results Channel 4183/836.6MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1672.99	-40.44	9.50	4.76	-35.70	-13.00	-22.70	H
2509.79	-40.16	10.70	8.40	-37.86	-13.00	-24.86	H
3346.14	-30.98	12.20	11.80	-30.58	-13.00	-17.58	H
1672.80	-44.00	9.40	4.75	-39.35	-13.00	-26.35	V
2509.47	-44.68	10.60	8.39	-42.47	-13.00	-29.47	V
3346.33	-43.34	12.20	11.82	-42.96	-13.00	-29.96	V
The Worst Test Results Channel 4233/846.6MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
1693.38	-40.23	9.60	4.77	-35.40	-13.00	-22.40	H
2539.25	-39.23	10.80	8.50	-36.93	-13.00	-23.93	H
3385.88	-31.64	12.50	11.90	-31.04	-13.00	-18.04	H
1693.43	-43.15	9.60	4.77	-38.32	-13.00	-25.32	V
2539.37	-45.12	10.80	8.50	-42.82	-13.00	-29.82	V
3385.85	-43.69	12.50	11.90	-43.09	-13.00	-30.09	V

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 has.

WCDMA Band II: (30-20000)MHz							
The Worst Test Results for Channel 9262/1852.4MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3704.37	-33.52	12.60	12.93	-33.85	-13.00	-20.85	H
5557.19	-35.36	13.10	17.11	-39.37	-13.00	-26.37	H
7409.47	-33.22	11.50	22.20	-43.92	-13.00	-30.92	H
3704.18	-35.89	12.60	12.93	-36.22	-13.00	-23.22	V
5557.41	-33.81	13.10	17.11	-37.82	-13.00	-24.82	V
7409.60	-33.16	11.50	22.20	-43.86	-13.00	-30.86	V
The Worst Test Results for Channel 9400/1880MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3760.20	-33.52	12.60	12.93	-33.85	-13.00	-20.85	H
5639.87	-35.47	13.10	17.11	-39.48	-13.00	-26.48	H
7520.14	-33.07	11.50	22.20	-43.77	-13.00	-30.77	H
3760.10	-35.98	12.60	12.93	-36.31	-13.00	-23.31	V
5640.28	-34.50	13.10	17.11	-38.51	-13.00	-25.51	V
7519.95	-32.40	11.50	22.20	-43.10	-13.00	-30.10	V
The Worst Test Results for Channel 9538/1907.6MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3815.39	-33.56	12.60	12.93	-33.89	-13.00	-20.89	H
5722.37	-34.68	13.10	17.11	-38.69	-13.00	-25.69	H
7630.18	-33.41	11.50	22.20	-44.11	-13.00	-31.11	H
3815.48	-35.90	12.60	12.93	-36.23	-13.00	-23.23	V
5722.17	-35.10	13.10	17.11	-39.11	-13.00	-26.11	V
7630.16	-33.00	11.50	22.20	-43.70	-13.00	-30.70	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 has.

WCDMA Band IV: (30-20000)MHz							
The Worst Test Results for Channel 1312/1712.4MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3424.85	-34.93	12.60	12.93	-35.26	-13.00	-22.26	H
5137.68	-34.13	13.10	17.11	-38.14	-13.00	-25.14	H
6849.22	-32.39	11.50	22.20	-43.09	-13.00	-30.09	H
3425.13	-35.75	12.60	12.93	-36.08	-13.00	-23.08	V
5137.97	-34.65	13.10	17.11	-38.66	-13.00	-25.66	V
6849.36	-31.86	11.50	22.20	-42.56	-13.00	-29.56	V
The Worst Test Results for Channel 1412/1732.4MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3464.18	-33.65	12.60	12.93	-33.98	-13.00	-20.98	H
5197.97	-34.94	13.10	17.11	-38.95	-13.00	-25.95	H
6929.13	-33.13	11.50	22.20	-43.83	-13.00	-30.83	H
3464.86	-35.66	12.60	12.93	-35.99	-13.00	-22.99	V
5197.56	-33.77	13.10	17.11	-37.78	-13.00	-24.78	V
6929.74	-32.05	11.50	22.20	-42.75	-13.00	-29.75	V
The Worst Test Results for Channel 1862/1752.5MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
3505.91	-34.35	12.60	12.93	-34.68	-13.00	-21.68	H
5257.18	-35.20	13.10	17.11	-39.21	-13.00	-26.21	H
7010.62	-32.93	11.50	22.20	-43.63	-13.00	-30.63	H
3505.33	-35.74	12.60	12.93	-36.07	-13.00	-23.07	V
5257.57	-35.16	13.10	17.11	-39.17	-13.00	-26.17	V
7010.16	-33.07	11.50	22.20	-43.77	-13.00	-30.77	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 has.

UHF(30-4000)MHz							
The Worst Test Results Low Channel 408.0 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
816.52	-37.94	8.20	3.11	-32.85	-13.00	-19.85	H
1224.81	-36.94	9.10	4.02	-31.86	-13.00	-18.86	H
1632.99	-38.92	9.50	4.76	-34.18	-13.00	-21.18	H
816.52	-40.76	8.20	3.11	-35.67	-13.00	-22.67	V
1224.81	-40.61	9.10	4.02	-35.53	-13.00	-22.53	V
1632.99	-40.59	9.50	4.76	-35.85	-13.00	-22.85	V
The Worst Test Results Mid Channel 428.0 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
856.54	-37.62	8.3	3.21	-32.53	-13.00	-19.53	H
1284.61	-36.73	9.2	4.23	-31.76	-13.00	-18.76	H
1712.63	-39.02	9.7	4.92	-34.24	-13.00	-21.24	H
856.54	-40.18	8.3	3.21	-35.09	-13.00	-22.09	V
1284.61	-41.85	9.2	4.23	-36.88	-13.00	-23.88	V
1712.63	-39.68	9.7	4.92	-34.90	-13.00	-21.90	V
The Worst Test Results High Channel 468.0 MHz							
Frequency (MHz)	S G.Lev (dBm)	Ant (dBi)	Loss	PMea	Limit	Margin	Polarity
				(dBm)	(dBm)	(dB)	
936.23	-37.37	8.4	3.34	-32.31	-13.00	-19.31	H
1404.28	-36.47	9.3	4.38	-31.55	-13.00	-18.55	H
1872.64	-37.69	9.8	4.98	-32.87	-13.00	-19.87	H
936.23	-40.81	8.4	3.34	-35.75	-13.00	-22.75	V
1404.28	-40.16	9.3	4.38	-35.24	-13.00	-22.24	V
1872.64	-40.30	9.8	4.98	-35.48	-13.00	-22.48	V

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

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

-----THE END OF REPORT-----