

RF - TEST REPORT

Report Number : **68.950.17.016.01** Date of Issue: **January 12, 2017**

Model : **MRHH600, MRHH600W**

Product Type : **MR HH600 GPS BT**

Applicant/man : **Cobra Electronics Corporation**

Address : **6500 West Cortland Street Chicago, IL**

Manufacturer : **XIN XING GREAT SUCCESS PLASTIC PRODUCTS LIMITED**

Address : **Building A, District 1, B2-02, Xincheng Industrial Park,
Xinxing, YunFu, Guangdong, P.R.C**

Test Result : **Positive** **Negative**

Total pages including Appendices : **25**

TÜV SÜD Certification and Testing (China) Co., Ltd. – Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. – Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. – Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. – Shenzhen Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval



Table of Content

1	Report Version.....	3
2	General Information.....	4
2.1	Notes.....	4
2.2	Testing Laboratory.....	5
2.3	Details of Applicant.....	5
2.4	Application Details.....	5
2.5	Test Item.....	5
2.6	Applied Standard.....	6
2.7	Test Summary.....	6
Table 1. Summary of results.....		6
3	Equipment Specification.....	7
3.1	General Description.....	7
3.2	Technical Data.....	7
3.3	Test frequency list.....	8
3.4	EUT operation mode.....	9
3.5	Environmental conditions.....	9
4	Test Conditions and Results.....	10
4.1	Transmitter Requirements.....	10
4.1.1	Frequency error (demodulated DSC signal).....	10
4.1.2	Modulation index for DSC.....	11
4.1.3	Modulation rate for DSC.....	12
4.1.4	Testing of generated call sequences.....	13
4.2	Receiver for DSC decoder.....	14
4.2.1	Maximum Usable Sensitivity.....	14
4.2.2	Co-channel rejection.....	15
4.2.3	Adjacent channel selectivity.....	16
4.2.4	Spurious response and blocking immunity.....	17
4.2.5	Intermodulation response.....	18
4.2.6	Dynamic range.....	19
4.2.7	Spurious emissions.....	20
4.2.8	Verification of correct decoding of various types of DSC calls.....	21
4.2.9	Reaction to VTS and AIS channel management DSC transmissions....	21
4.2.10	Simultaneous reception.....	22
5	Statement of the measurement uncertainty.....	23
6	Equipments Used during the Test.....	24



1 Report Version

Revision	Release Date	History/Memo.
1.0	January 12, 2017	Initial Release



2 General Information


2.1 Notes

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch is a subcontractor to TÜV SÜD Product Service GmbH according to the principles outlined in ISO 17025.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

Prepared by Project Engineer	2017-01-12	Alan Xiong	
	Date	Name	Signature

Approved by Section Manager	2017-01-12	John Zhi	
	Date	Name	Signature

2.2 Testing Laboratory

Test Site 1:


TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Address: Building 12&13, Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2, Nanshan District,
Shenzhen City, 518052,
P. R. China,
Phone: +86-755-8828 6998
Fax: +86-755-8828 5299

Test Site 2:

SHENZHEN HUATONGWEI INTERNATIONAL INSPECTIONAL CO., LTD.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao,
Gongming, Shenzhen, China
Phone: +86-755-26748019
Fax: +86-755-26748089

Remark: All test items were performed at site 2.

2.3 Details of Applicant

Client:	Cobra Electronics Corporation
Address:	6500 West Cortland Street Chicago, IL
Product Description:	MR HH600 GPS BT
Submitted Model No.:	MRHH600, MRHH600W
Brand Name:	

2.4 Application Details

Date of receipt of order:	November 24, 2016
Date of receipt of test item:	November 24, 2016
Date of test:	November 24, 2016 – December 26, 2016

2.5 Test Item

Refer to table 1

2.6 Applied Standard

IEC 62238	Maritime navigation and radiocommunication equipment and systems – VHF radiotelephone equipment incorporating Class "D" Digital Selective Calling (DSC) – Methods of testing and required test results
-----------	--

2.7 Test Summary

Table 1. Summary of results


Transmitter Requirement			
Test item	Standards requirement (IEC 62238)	Result	
		Pass	N/A
Frequency error (DSC signal)	Sub-clause 8.11	<input checked="" type="checkbox"/>	
Modulation index for DSC	Sub-clause 8.12	<input checked="" type="checkbox"/>	
Modulation rate for DSC	Sub-clause 8.13	<input checked="" type="checkbox"/>	
Testing of generated call sequences	Sub-clause 8.14	<input checked="" type="checkbox"/>	
DSC Signalling Requirement			
Test item	Standards requirement (IEC 62238)	Result	
		Pass	N/A
Maximum usable sensitivity	Sub-clause 10.1	<input checked="" type="checkbox"/>	
Co-channel rejection	Sub-clause 10.2	<input checked="" type="checkbox"/>	
Adjacent channel selectivity	Sub-clause 10.3	<input checked="" type="checkbox"/>	
Spurious response and blocking immunity	Sub-clause 10.4	<input checked="" type="checkbox"/>	
Intermodulation response	Sub-clause 10.5	<input checked="" type="checkbox"/>	
Dynamic range	Sub-clause 10.6	<input checked="" type="checkbox"/>	
Spurious emissions	Sub-clause 10.7	<input checked="" type="checkbox"/>	
Verification of correct decoding of various types of DSC calls	Sub-clause 10.8	<input checked="" type="checkbox"/>	
Reaction to VTS and AIS channel management DSC transmissions	Sub-clause 10.9	<input checked="" type="checkbox"/>	
Simultaneous reception	Sub-clause 10.10	<input checked="" type="checkbox"/>	

3 Equipment Specification

3.1 General Description

The Equipment Under Test (EUT) is a VHF transceiver for the maritime mobile service with bluetooth and GPS receive function.

3.2 Technical Data

Name of EUT:	MR HH600 GPS BT			
Trade mark:				
Model/Type reference:	MRHH600, MRHH600W			
Power supply:	7.4Vdc 2000mAh supplied by rechargeable battery			
Battery information:	Model: FT704159P			
Adapter information:	Model: K12S120100U Input: 100-240Va.c., 50/60Hz, 0.45A Output: 12Vd.c., 1.0A			
Car Charger:	Input: 12Vdc, 1.0A Output: 12Vdc., 1.0A			
Marine Radio				
Operation Frequency Range:	TX: 156.025MHz to 157.425MHz			
	RX: 156.3MHz to 162MHz			
Rated Output Power:	<input checked="" type="checkbox"/> High Power:	5W (36.98dBm)	<input checked="" type="checkbox"/> Low Power	1W (30.00dBm)
Modulation Type:	Analog Voice:	PM		
	Digital Data(DSC):	FSK		
Channel Separation:	Analog Voice:	25kHz		
	Digital Data(DSC):	25kHz		
Emission Designator:	Analog Voice:	16K0G3E		
	Digital Data(DSC):	16K0G2B		
Maximum Transmitter Power:	Analog Voice:	5.77W		
	Digital Data(DSC):	N/A		
Antenna Type:	External			

Remark 1: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Remark 2: As per Client Declaration, MRHH600 and MRHH600W are identical, only the cosmetics have different color, so we use MRHH600 as a representative to perform all testing.

3.3 Test frequency list

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	
			TX	RX
Analog Voice/PM	25kHz	CH _L (CH60)	156.025	160.625
		CH _M (CH16)	156.800	156.800
		CH _H (CH88)	157.425	157.425

Modulation Type	Channel Separation	Test Channel	Test Frequency (MHz)	
			TX	RX
Digital Data(DSC) / FSK	25kHz	CH _{M1} (CH70)	156.525	156.525

Note: The Product channel frequency table: International Marine VHF Channels and Frequencies:

Channel	TX Frequency (MHz)	RX Frequency (MHz)	Channel	TX Frequency (MHz)	RX Frequency (MHz)
1	156.05	160.65	60	156.025	160.625
2	156.1	160.7	61	156.075	160.675
3	156.15	160.75	62	156.125	160.725
4	156.2	160.8	63	156.175	160.775
5	156.25	160.85	64	156.225	160.825
6	156.3	156.3	65	156.275	160.875
7	156.35	160.95	66	156.325	160.925
8	156.4	156.4	67	156.375	156.375
9	156.45	156.45	68	156.425	156.425
10	156.5	156.5	69	156.475	156.475
11	156.55	156.55	71	156.575	156.575
12	156.6	156.6	72	156.625	156.625
13	156.65	156.65	73	156.675	156.675
14	156.7	156.7	74	156.725	156.725
15	156.75	156.75	75	156.775	156.775
16	156.8	156.8	76	156.825	156.825
17	156.85	156.85	77	156.875	156.875
18	156.9	161.5	78	156.925	161.525
19	156.95	161.55	79	156.975	161.575
20	157	161.6	80	157.025	161.625
21	157.05	161.65	81	157.075	161.675
22	157.1	161.7	82	157.125	161.725
23	157.15	161.75	83	157.175	161.775
24	157.2	161.8	84	157.225	161.825
25	157.25	161.85	85	157.275	161.875
26	157.3	161.9	86	157.325	161.925
27	157.35	161.95	87	157.375	157.375
28	157.4	162	88	157.425	157.425
70	156.525	156.525	-	-	-



3.4 EUT operation mode

Test mode	Transmitting	Receiving	Power level		Analog Voice/PM
			High	Low	25kHz
TX1	√		√		√
TX2	√			√	√
RX1		√			√

Test mode	Transmitting	Receiving	States			Digital Data(DSC)/FSK
			B	Y	B+Y	25kHz
TX3	√		√			√
TX4	√			√		√
TX5	√				√	√
RX2		√				√

√: is operation mode.

3.5 Environmental conditions

Normal Condition	Temperature	15 °C to 35 °C		
	Relative humidity	20 % to 75 %.		
	Voltage	<input type="checkbox"/> Mains voltage	Nominal mains voltage	
<input type="checkbox"/> Lead-acid battery		1.1 * the nominal voltage of the battery		
<input checked="" type="checkbox"/> Other		the normal test voltage shall be that declared by the equipment provider		
Extreme Condition	Temperature	<input checked="" type="checkbox"/> -20°C to +55 °C		
	Voltage	<input type="checkbox"/> Mains voltage	±10 %* the nominal mains voltage	
		<input type="checkbox"/> Lead-acid battery	1,3 and 0,9 multiplied by the nominal voltage of the battery	
		<input checked="" type="checkbox"/> Leclanché or the lithium battery	Lower extreme voltage: 0.85*the nominal voltage upper extreme voltage: the terminal voltage of the battery (fresh primary battery or fully charged secondary battery) when loaded by the equipment at normal temperature in the receive condition with the squelch operated to mute the audio.	
		<input type="checkbox"/> Nickel-cadmium battery	Lower extreme voltage: 0.9*the nominal voltage upper extreme voltage: declared by the equipment provider	
<input type="checkbox"/> Other	the normal test voltage shall be that declared by the equipment provider			

power supply	DC 7.4V	
Normal Condition	Vn=nominal Voltage	DC 7.40V
	Tn=normal Temperature	25°C
Extreme Condition	V _L =lower Voltage	DC 6.29V
	T _L =lower Temperature	-20°C
	V _H =higher Voltage	DC 8.40V
	T _H =higher Temperature	55°C

4 Test Conditions and Results

4.1 Transmitter Requirements

4.1.1 Frequency error (demodulated DSC signal)

The frequency error for the B- and the Y-state is the difference between the measured frequency from the demodulator and the nominal values.

Limit

IEC 62238 Sub-clause 8.11.3

The measured frequency from the demodulator at any time for the B-state shall be within $2\ 100\ \text{Hz} \pm 10\ \text{Hz}$ and for the Y-state within $1\ 300\ \text{Hz} \pm 10\ \text{Hz}$.

Test procedure

1. The test conditions.

normal condition

Extreme conditions

2. Please refer to IEC 62238 Sub-clause 8.12.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed

Not Applicable

Operation Mode	Test conditions		Frequency Error (kHz)	Limit (Hz)	Result
	Temperature (°C)	Voltage(V)	CH _{M1}		
TX3	T _n	V _n	2100.023	2100±10	Pass
	T _L	T _H	2100.019		
		V _L	2100.021		
	T _H	T _H	2100.019		
V _L		2100.022			

Operation Mode	Test conditions		Frequency Error (kHz)	Limit (Hz)	Result
	Temperature (°C)	Voltage(V)	CH _{M1}		
TX4	T _n	V _n	1300.021	1300±10	Pass
	T _L	T _H	1300.022		
		V _L	1300.019		
	T _H	T _H	1300.025		
V _L		1300.024			



4.1.2 Modulation index for DSC

This test measures the modulation index in the B and Y states.

Limit

IEC 62238 Sub-clause 8.12.3

The modulation index shall be $2,0 \pm 10 \%$.

Test procedure

1. The test conditions.

normal condition Extreme conditions

2. Please refer to IEC 62238 Sub-clause 8.12.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Operation Mode	Test Channel	Modulation index	Limit	Result
TX3	CH _{M1}	1.81	$2.0 \pm 10 \%$	Pass
TX4	CH _{M1}	1.94	$2.0 \pm 10 \%$	Pass



4.1.3 Modulation rate for DSC

The modulation rate is the bit stream speed measured in bit/s.

Limit

IEC 62238 Sub-clause 8.13.3

The frequency shall be 600 Hz ± 30 ppm corresponding to a modulation rate of 1 200 baud.

Test procedure

1. The test conditions.

normal condition

Extreme conditions

2. Please refer to IEC 62238 Sub-clause 8.13.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed

Not Applicable

Operation Mode	Test Channel	Modulation rate (Hz)	Limit	Result
TX5	CH _{M1}	494.550	600Hz ± 30 ppm	Pass



4.1.4 Testing of generated call sequences

Generated call sequences are call which comply with the requirements of ITU-R. Recommendation M.493-10.

Requirement

IEC 62238 Sub-clause 8.14.3

The requirements of ITU-R Recommendation M.493-10 regarding message composition and content shall be met.

The generated calls shall be analyzed with the calibrated apparatus for correct configuration of the signal format, including time diversity.

It shall be verified that, after transmission of a DSC call, the transmitter re-tunes to the original channel. However, in the case of a distress call, the transmitter shall tune to channel 16 and automatically select the maximum power.

The telecommands used and the channels tested for switching shall be stated in the test report.

Test results

Passed

Not Applicable

Complies

4.2 Receiver for DSC decoder

4.2.1 Maximum Usable Sensitivity

The maximum usable sensitivity of the receiver is the minimum level of the signal (e.m.f.) at the nominal frequency of the receiver which when applied to the receiver input with a test modulation will produce a bit error ratio of 10^{-2}

Limit

IEC 62238 Sub-clause 10.1.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.

normal condition

Extreme conditions

2. Please refer to IEC 62238 Sub-clause 10.1.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed

Not Applicable

Please refer to the below test data:

Operation Mode	Test Condition		Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
	Temperature (°C)	Voltage (V)				
RX	25	7.4	156.525	0.0071	$\leq 10^{-2}$	Pass
				0.0074		
	-10	7.4	156.525	0.0072	$\leq 10^{-2}$	Pass
				0.0075		
		6.29	156.525	0.0085	$\leq 10^{-2}$	Pass
				0.0083		
	55	7.4	156.525	0.0078	$\leq 10^{-2}$	Pass
				0.0082		
		6.29	156.525	0.0084	$\leq 10^{-2}$	Pass
				0.0084		

4.2.2 Co-channel rejection

The co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.

Limit

IEC 62238 Sub-clause 10.2.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

- The test conditions.
 normal condition Extreme conditions
- Please refer to IEC 62238 Sub-clause 10.2.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Measurement Offset (kHz)	Measured (error ratio)	Limit (error ratio)	Result
RX	156.525	-3	0.0048	$\leq 10^{-2}$	Pass
		0	0.0051		
		3	0.0063		

4.2.3 Adjacent channel selectivity

The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal which differs in frequency from the wanted signal by 25 kHz.

Limit

IEC 62238 Sub-clause 10.3.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.

normal condition

Extreme conditions

2. Please refer to IEC61138 Sub-clause 10.3.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed

Not Applicable

Please refer to the below test data:

Operation Mode	Test Condition		Test Frequency (MHz)	Measurement Position	Measured (error ratio)	Limit (error ratio)	Result
	Temperature (° C)	Voltage (V)					
RX	25	7.4	156.525	Lower adjacent	0.0077	$\leq 10^{-2}$	Pass
				Upper adjacent	0.0073		
	-10	7.4	156.525	Lower adjacent	0.0074	$\leq 10^{-2}$	Pass
				Upper adjacent	0.0075		
		6.29	156.525	Lower adjacent	0.0081	$\leq 10^{-2}$	Pass
				Upper adjacent	0.0080		
	55	7.4	156.525	Lower adjacent	0.0078	$\leq 10^{-2}$	Pass
				Upper adjacent	0.0081		
		6.29	156.525	Lower adjacent	0.0085	$\leq 10^{-2}$	Pass
				Upper adjacent	0.0083		

4.2.4 Spurious response and blocking immunity

The spurious response and blocking immunity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal with frequencies outside the pass band of the receiver.

Limit

IEC 62238 Sub-clause 10.4.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.
 - normal condition
 - Extreme conditions
2. Please refer to IEC 62238 Sub-clause 10.4.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Relationship	Spurious Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
RX	156.525	$f_{RF1}-f_{LO}/2$	145.825	0.0065	$\leq 10^{-2}$	Pass
		$f_{RF1}-2*f_{LO}$	113.725	0.0059		
		f_{LO}	21.4	0.0044		
		$2*f_{H1}-f_{LO}$	248.85	0.0062		

Operation Mode	Test Frequency (MHz)	Measurement Offset (MHz)	Measured (error ratio)	Limit (error ratio)	Result
RX	156.525	-10	0.0074	$\leq 10^{-2}$	Pass
		-5	0.0069		
		-2	0.0063		
		-1	0.0055		
		1	0.0053		
		2	0.0066		
		5	0.0075		
		10	0.0079		



4.2.5 Intermodulation response

The intermodulation response is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.

Limit

IEC 62238 Sub-clause 10.5.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.
 normal condition Extreme conditions
2. Please refer to IEC 62238 Sub-clause 10.5.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Measurement Offset (kHz)		Measured (error ratio)	Limit (error ratio)	Result
		SG B	SG C			
RX	156.525	-50	-100	0.0072	$\leq 10^{-2}$	Pass
		50	100	0.0064		

4.2.6 Dynamic range

The dynamic range of the equipment is the range from the minimum to the maximum level of a radio frequency input signal at which the bit error ratio in the output of the decoder does not exceed a specified value.

Limit

IEC 62238 Sub-clause 10.6.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.
 - normal condition
 - Extreme conditions
2. Please refer to IEC 62238 Sub-clause 10.6.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
RX	156.525	0.0069	$\leq 10^{-2}$	Pass



4.2.8 Verification of correct decoding of various types of DSC calls

Test results

Passed Not Applicable

4.2.9 Reaction to VTS and AIS channel management DSC transmissions

Test results

Passed Not Applicable



4.2.10 Simultaneous reception

Simultaneous reception is the ability of the unit to correctly receive DSC traffic and radiotelephony traffic at the same time.

Limit

IEC 62238 Sub-clause 10.10.3

The bit error ratio shall be equal to or less than 10^{-2}

Test procedure

1. The test conditions.

normal condition Extreme conditions

2. Please refer to IEC 62238 Sub-clause 10.10.2 for the measurement method.

Test mode

Please reference to the section 3.4

Test results

Passed Not Applicable

Please refer to the below test data:

Operation Mode	Test Frequency (MHz)	Measured (SINAD ratio)	Limit (SINAD ratio)	Result
RX	156.8	24.6	≥ 20	Pass

Operation Mode	Test Frequency (MHz)	Measured (error ratio)	Limit (error ratio)	Result
RX	156.525	0.0062	$\leq 10^{-2}$	Pass

5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Huatongwei International Inspection 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 Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
RF frequency	25 Hz	(1)
RF power	0.55 dB	(1)
Maximum frequency deviation: within 300 Hz to 6 kHz of modulation frequency	2.6 %	(1)
Maximum frequency deviation: within 6 kHz to 25 kHz of modulation frequency	2.20 dB	(1)
Deviation limitation	3.5 %	(1)
Adjacent channel power	1.20 dB	(1)
Conducted spurious emission of transmitter	0.57 dB	(1)
Audio output power	0.25 dB	(1)
Amplitude characteristics of receiver limiter	1.20 dB	(1)
Sensitivity at 20 dB SINAD	2.60 dB	(1)
Conducted emission of receiver	1.60 dB	(1)
Two-signal measurement	2.80 dB	(1)
Three-signal measurement	2.20 dB	(1)
Radiated emission of transmitter	2.20 dB	(1)
Radiated emission of receiver	2.20 dB	(1)
Transmitter transient time	6.8 %	(1)
Transmitter transient frequency	75 Hz	(1)
Receiver desensitization (duplex operation)	0.25 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

6 Equipments Used during the Test

Frequency Deviation					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

Unwanted emissions in the spurious domain					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	11/13/2016
2	EMI TEST SOFTWARE	Audix	E3	N/A	N/A
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016
4	High-Pass Filter	Anritsu	MP526D	6220878392	11/13/2016
5	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	11/13/2016
6	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	11/13/2016
7	HORN ANTENNA	ShwarzBeck	9120D	1011	11/13/2016
8	HORN ANTENNA	ShwarzBeck	9120D	1012	11/13/2016
9	TURNTABLE	MATURO	TT2.0	----	N/A
10	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
11	SPECTRUM ANALYZER	Agilent	E4407B	MY44210775	11/13/2016

Frequency Error & Carrier power (Conducted)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESIB26	100009	11/13/2016
2	Climate Chamber	ESPEC	EL-10KA	05107008	11/13/2016
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

Adjacent Channel Power					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Receiver	Rohde&Schwarz	ESI26	100009	11/13/2016
2	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

Maximum Usable Sensitivity					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Climate Chamber	ESPEC	EL-10KA	05107008	11/13/2016

2	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016
---	---------------------------	----	-------	------------	------------

Adjacent Channel Selectivity

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	Rohde&Schwarz	SMT03	100059	11/13/2016
2	Climate Chamber	ESPEC	EL-10KA	05107008	11/13/2016
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

Co-channel rejection & Spurious Response Rejection & Inter Modulation Response Rejection & Blocking or Desensitization

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	Rohde&Schwarz	SMT03	100059	11/13/2016
2	Signal Generator	IFR	2032	203002/100	11/13/2016
3	RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

Transient Frequency Behavior

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.
Signal Generator	Rohde&Schwarz	SMT03	100059	11/13/2016
Storage Oscilloscope	Tektronix	TDS3054B	B033027	11/13/2016
RF COMMUNICATION TEST SET	HP	8920A	3813A10206	11/13/2016

The Cal. Interval was one year.

THE END