Report No: CCIS13070022501

EMC REPORT (mobile phone)

Applicant:	Shenzhen Concox Information Technology Co., Ltd
Address of Applicant:	Floor 4th, Building B, Gaoxinqi Industrial Park, Liuxian 1st Road, District 67, Bao'an, Shenzhen,Guangdong

Equipment Under Test (EUT)

Product Name:	GPS Vehicle tracker
Model No.:	TR02,TR02N,TR02A,GT02A,GT02B,GT02D
Applicable standards:	ETSI EN 301 489-7 V1.3.1 (2005-11) ETSI EN 301 489-1 V1.9.2 (2011-09)
Date of sample receipt:	18 Jul., 2013
Date of Test:	19 Jul., to 22 Jul., 2013
Date of report issue:	23 Jul., 2013
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 1999/5/EC are considered.

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

2 Version

Version No.	Date	Description
00	*23 Jul., 2013*	*Original*

Prepared By:  ***Date:*** *23 Jul., 2013*

Report Clerk

Check By:  ***Date:*** *23 Jul., 2013*

Project Engineer

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4 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 6GHz)	ETSI EN 301 489-7 V1.3.1 (2005-11) 7.1	ETSI EN 301 489-1 V1.9.2 (2011-09) 8.2	Class B	PASS
Radiated Immunity (80MHz to 1GHz) (1.4GHz to 2.7GHz)	ETSI EN 301 489-7 V1.3.1 (2005-11) 7.2	ETSI EN 301 489-1 V1.9.2 (2011-09) 9.2	3V/m, 80%, 1kHz, Amp. Mod.	PASS
Radio frequency common mode	ETSI EN 301 489-7 V1.3.1 (2005-11) 7.2	ETSI EN 301 489-1 V1.9.2 (2011-09) 9.5	150kHz to 80MHz 3V, 80%, 1kHz, Amp. Mod.	PASS
Transients and surges in the vehicular environment	ETSI EN 301 489-7 V1.3.1 (2005-11) 7.2	ETSI EN 301 489-1 V1.9.2 (2011-09) 9.6	DC power input ports	PASS

5 General Information

5.1 Client Information

Applicant:	Shenzhen Concox Information Technology Co., Ltd
Address of Applicant:	Floor 4th, Building B, Gaoxinqi Industrial Park, Liuxian 1st Road, District 67, Bao'an, Shenzhen,Guangdong
Manufacturer:	Shenzhen Concox Information Technology Co., Ltd
Address of Manufacturer:	Floor 4th, Building B, Gaoxinqi Industrial Park, Liuxian 1st Road, District 67, Bao'an, Shenzhen,Guangdong

5.2 EUT: Type, S/N etc. and Short Descriptions Used in this Test Report

	Radio equipment	Model	IMEI	HW hardware status	SW software
EUTA	GPS Vehicle tracker	TR02,TR02N,TR02A,GT02A,GT0B, GT02D	-----	GT02B_MB_V2.2	MT6252_S01.TR02B_21_8MM_CTA
Note: 1. EUT short description is used to simplify the identification of the EUT in this test report. 2. The Model: TR02,TR02N,TR02A,GT02A,GT02B,GT02D were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being different model number.					
	Ancillary equipment	**Model**	**Type**	**HW hardware status**	**SW software**
EUT B	DC power input line	--	--	--	--
Note: EUT short description is used to simplify the identification of the EUT in this test report.					

5.3 EUT A Radio Equipment

EUT A	GPS Vehicle tracker			
Model	TR02,TR02N,TR02A,GT02A,GT02B,GT02D			
Equipment classification	equipment for portable use (according to ETSI EN 301 489-1, clause 5.5)			
Environment classification	residential, commercial and light industry environment (according to ETSI EN 301 489-1, clause 1)			
Operating frequency bands	E-GSM900	TX: 880---915MHz		
		Rx: 925---960 MHz		
	DCS1800	TX: 1710--1785 MHz		
		RX: 1805----1880 MHz		
Supply voltage	DC 12V			
Ports (maximum cable lengths declared by manufacturer)	**Classification and description**		**Direction**	**Length**
	DC power port multifunction interface		input	--
	--		--	--
Additional information:				
The test located channel 60 of GSM900 and channel 700 of DCS1800.				

5.4 EUT Operating Modes

NO.	Description of Operating modes	Additional information
OP1	Traffic mode 900 MHz	A Communication link was established in the mentioned band 1ABT was observed during test according to the standard 2RXQ was observed during test according to the standard 3Continuing working in correct operating mode after test
OP2	Idle mode 900 MHz	The EUT was registered in the mentioned band.
OP3	Traffic mode 1800 MHz	A Communication link was established in the mentioned band 1ABT was observed during test according to the standard 2RXQ was observed during test according to the standard 3Continuing working in correct operating mode after test
OP4	Idle mode 1800 MHz	The EUT was registered in the mentioned band.
Note: OP short description is used to simplify the identification of the operating mode in this test report.		

5.5 Auxiliary Equipment (AE): Type, S/N etc. and Short Descriptions

	Ancillary equipment	Type	S/N serial number
AE1	Audio Analyzer	Rohde & Schwarz	UPL 16
AE2	NEXUS CONDITIONING AMPLIFIER	B&K	2690
AE3	MUTH SIMULATOR	B&K	4227
AE4	SOUND LEVEL CALIBRATOR	B&K	4231
AE5	UNIVERSAL RADIO COMMUNICATION TESTER	Rohde & Schwarz	CMU200
AE6	PC	IBM	2662
Note: EUT short description is used to simplify the identification of the EUT in this test report.			

5.6 EUT Setup

	Combination of radio with ancillary equipment	Remark
SET	EUT A + EUT B	--

5.7 Laboratory Environment

Temperature:	15°C – 35°C
Relative humidity content	30 % - 60 %
Air pressure	860 hPa – 1060 hPa
Details of mains power	DC 12V

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: 0755-23118282
Fax: 0755-23116366

5.9 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012.

● **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

● **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

6 Equipment Used during Test

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	June 09 2013	June 08 2014
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	CCIS0002	N/A	N/A
3	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	June 04 2013	June 03 2014
4	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	May 30 2013	May 30 2014
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
6	Coaxial Cable	CCIS	N/A	CCIS0016	Apr. 01 2013	Mar. 31 2014
7	Coaxial Cable	CCIS	N/A	CCIS0017	Apr. 01 2013	Mar. 31 2014
8	Coaxial cable	CCIS	N/A	CCIS0018	Apr. 01 2013	Mar. 31 2014
9	Coaxial Cable	CCIS	N/A	CCIS0019	Apr. 01 2013	Mar. 31 2014
10	Coaxial Cable	CCIS	N/A	CCIS0087	Apr. 01 2013	Mar. 31 2014
11	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2013	Mar. 31 2014
12	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2013	June 08 2014
13	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Apr. 01 2013	Mar. 31 2014
14	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2013	Mar. 29 2014
15	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
16	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
17	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	May. 29 2013	May. 28 2014
18	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2013	Mar. 31 2014
19	Loop antenna	Laplace instrument	RF300	EMC0701	Aug. 12 2012	Aug. 11 2013
20	Artificial Network	Rohde & Schwarz	ESH3-Z6	SEL0044	Aug. 12 2012	Aug. 11 2013
21	Artificial Network	Rohde & Schwarz	ESH3-Z6	SEL0045	Aug. 12 2012	Aug. 11 2013

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	June 09 2013	June 08 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	May 25 2013	May 25 2014
3	LISN	CHASE	MN2050D	CCIS0074	Apr 01 2013	Mar. 31 2014
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2013	Mar. 31 2014
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

Conducted Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	RF-Generator	SCHAFFNER	NSG 2070	SEL0039	Oct. 22 2012	Oct. 21 2013
2	Coupling/Decoupling Network	SCHAFFNER	CDN M016	SEL0040	Oct. 22 2012	Oct. 21 2013
3	EM CLAMP	SCHAFFNER	KEMZ 801	SEL0041	Oct. 22 2012	Oct. 21 2013

Harmonic/ Flicker:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Power Analyzer	EMTEST	DPA500	GTS235	Jul. 04 2013	Jul. 03 2014
2	AC Power Source	EMTEST	ACS500	GTS236	Jul. 04 2013	Jul. 03 2014
3	Test software	EMTEST	ACS	N/A	N/A	N/A

Transients and surges:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Generator EM TEST	EMTEST	UCS200-M	SEL0042	Jul. 04 2013	Jul. 03 2014
2	Generator EM TEST	EMTEST	VDS200	SEL0043	Jul. 04 2013	Jul. 03 2014

Radiated Immunity:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	June 16 2013	June 15 2014
2	Signal Generator	Rohde & Schwarz	SML03	SEL0068	June 23 2013	June 22 2014
3	RF Amplifier 30M-1GHz	Amplifier Research	250W1000A	SEL0066	Nov. 05 2012	Nov. 04 2013
4	RF Amplifier 0.8-3.0GHz	Amplifier Research	60S1G3	SEL0065	Nov. 05 2012	Nov. 04 2013
5	Power Meter	Rohde & Schwarz	NRVD	SEL0069	June 23 2013	June 22 2014
6	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0071	June 23 2013	June 22 2014
7	Power Sensor	Rohde & Schwarz	URV5-Z2	SEL0072	June 23 2013	June 22 2014
8	Software EMC32	Rohde & Schwarz	EMC32-S	SEL0082	N/A	N/A
9	Log-periodic Antenna	Amplifier Research	AT1080	SEL0073	N/A	N/A
10	Antenna Tripod	Amplifier Research	TP1000A	SEL0074	N/A	N/A
11	High Gain Horn Antenna (0.8-5GHz)	Amplifier Research	AT4002A	SEL0075	N/A	N/A

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	GTS243	Jul. 06 2013	Jul. 05 2014
2	Barometer	ChangChun	DYM3	GTS255	July 11 2013	July 10 2014

7 EMC Requirements Specification in ETSI EN 301 489-7

EMI in ETSI EN 301 489-1, sub clause 7.1 table 1.

EMS in ETSI EN 301 489-1, sub clause 7.2 table 2.

7.1 EMI (Emission) test results

7.1.1 Radiated Emission

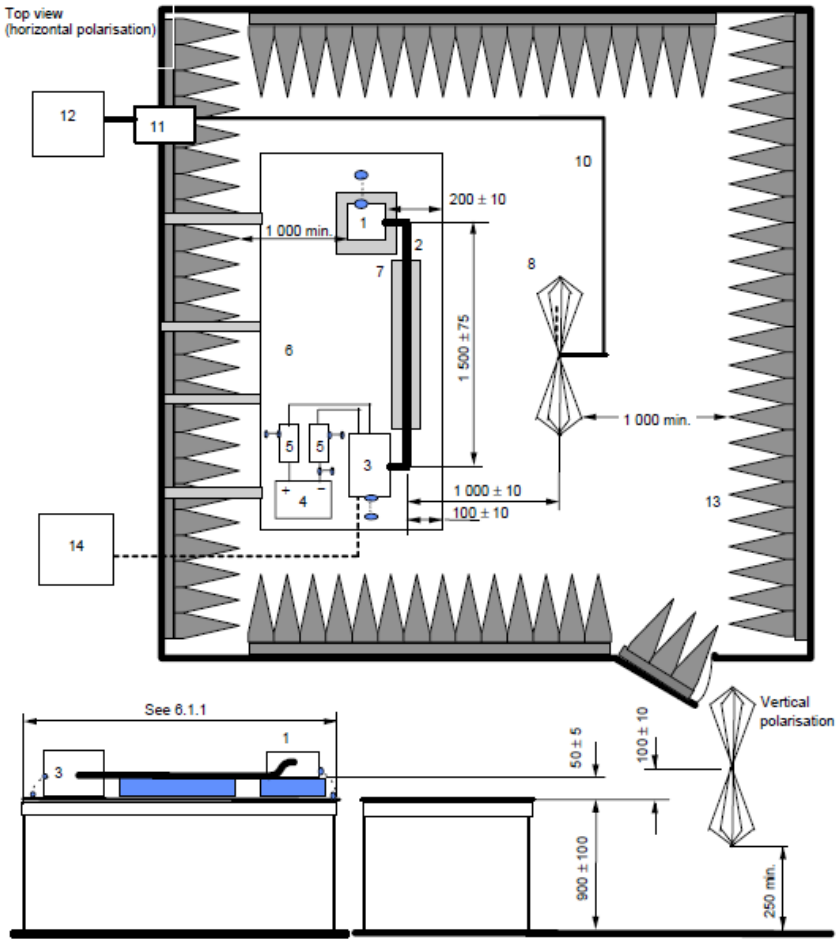
Test Method:	ETSI EN 301 489-1 clause 8.2.2 (EN 55016-2-3)
EUT Operation:	
Ambient:	Temp.: 25.5°C, Humid.: 55 % Press.: 101 kPa
Measurement Record:	Uncertainty: 4.88dB
Test mode:	OP1, OP2, OP3, OP4
Test setup:	SET
Test procedure:	Pre-scan the above modes separately, and found the worst case mode which was OP1. The below data is test data of the worst mode.
Test set-up and Limit:	

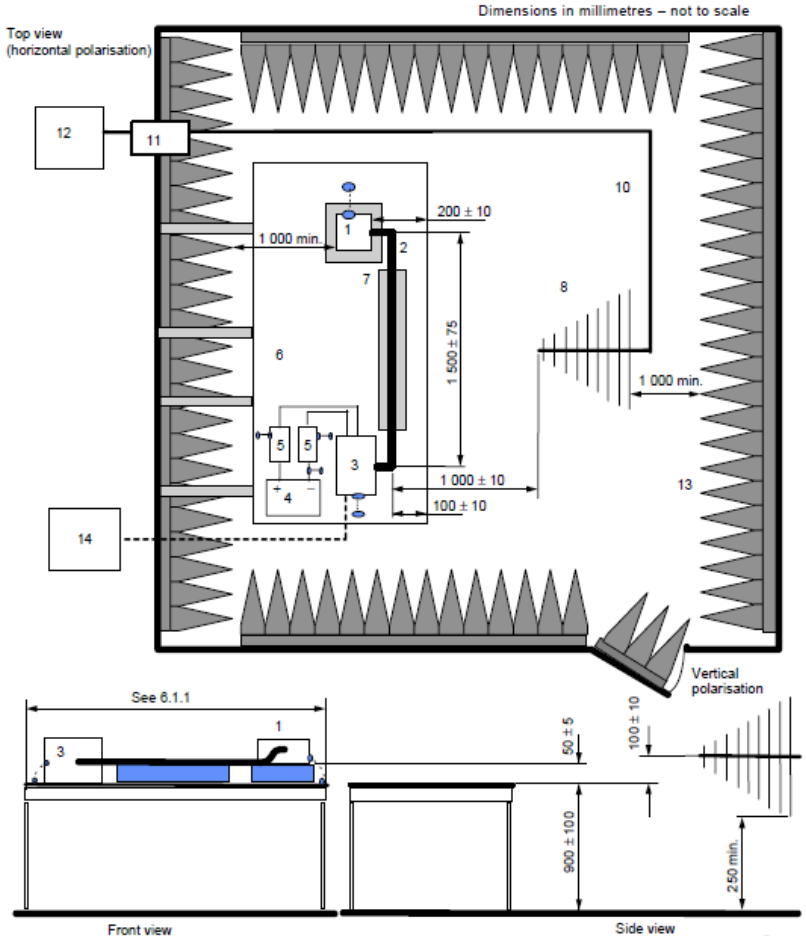
Frequency	Broadband QP limit (dBuV/m)	Narrowband AV limit (dBuV/m)	RBW
30MHz-75MHz	62-25, 13log(F/30)	52-25, 13log(F/30)	120kHz
75MHz-400MHz	52+15, 13log(F/75)	42+15, 13log(F/75)	120kHz
400MHz-1GHz	63	63	120kHz

Test Procedure:	The general arrangement of the disturbance source and connecting harnesses, etc. represents a standardised test condition. Any deviations from the standard test harness length, etc. shall be agreed upon prior to testing and recorded in the test report. The EUT shall be made to operate under typical loading and other conditions as in the vehicle such that the maximum emission state occurs. These operating conditions shall be clearly defined in the test plan to ensure supplier and customer can perform identical tests. The orientation(s) of the EUT for radiated emission measurements shall be defined in the test plan. From 150 kHz to 30 MHz measurements shall be performed in vertical polarisation only. From 30 MHz to 2 500 MHz measurements shall be performed in vertical and horizontal polarisations.
Equipment Used:	Please refer to the section 6.
Remark:	The test data of below 30MHz and above 1GHz is too lower than the limit, so not show in this report.

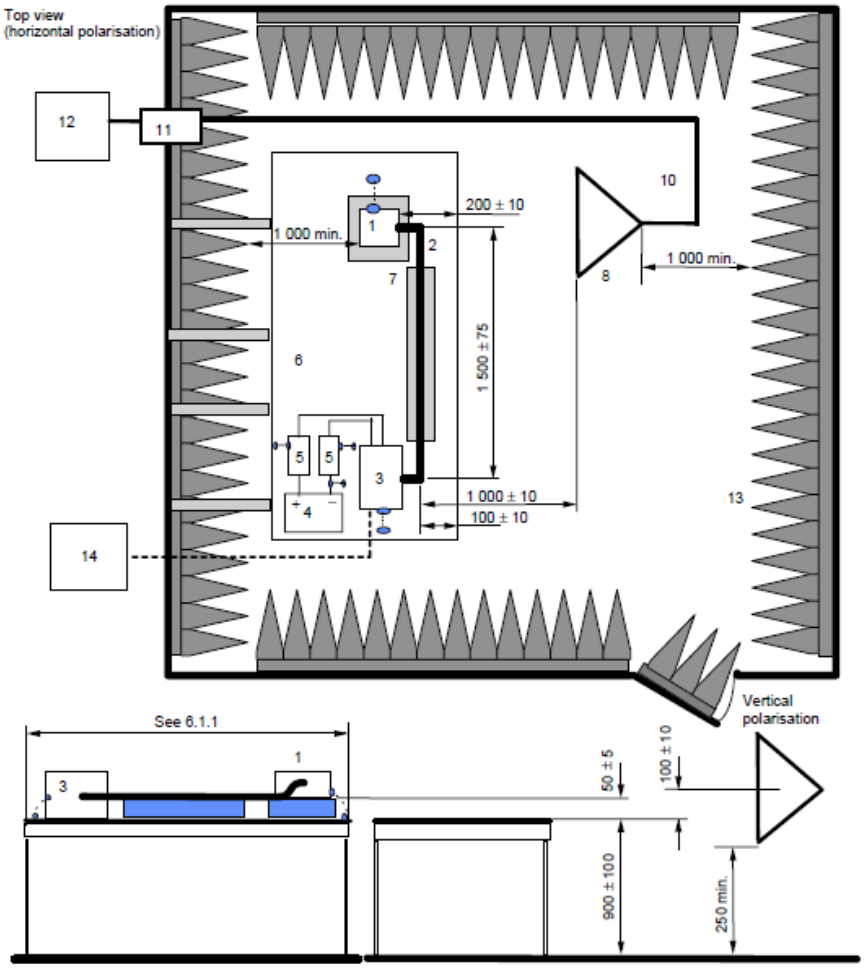
Test Configuration:

Below 1GHz




Dimensions in millimetres – not to scale
Top view
(horizontal polarisation)
12
11
10
200 ± 10
1 000 min.
1
2
7
8
6
1 500 ± 75
1 000 min.
5
5
3
4
1 000 ± 10
100 ± 10
13
14
Vertical
polarisation
See 6.1.1
1
3
50 ± 5
100 ± 10
900 ± 100
250 min.
Front view
Side view

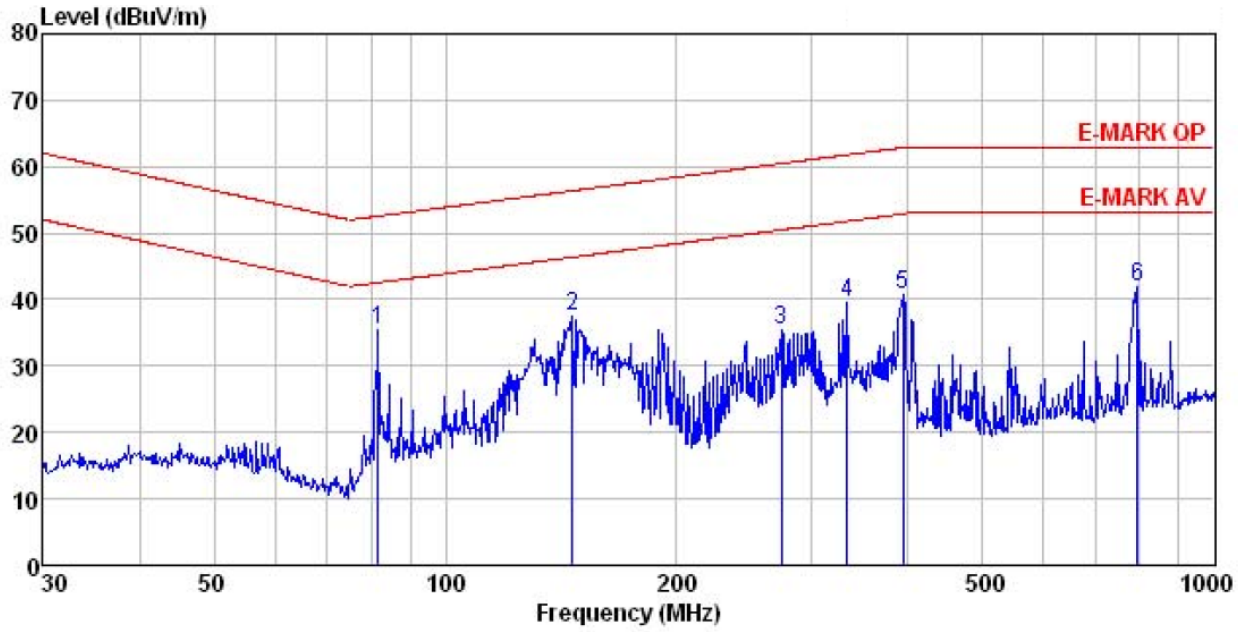
Above 1GHz


Top view
(horizontal polarisation)
12
11
10
200 ± 10
1 000 min.
1
2
7
8
1 000 min.
1 500 ± 75
6
5
5
3
4
1 000 ± 10
100 ± 10
13
14
Vertical
polarisation
See 6.1.1
1
3
50 ± 5
100 ± 10
900 ± 100
250 min.

Below 1GHz

Test mode:	OP1	Test setup:	SET	

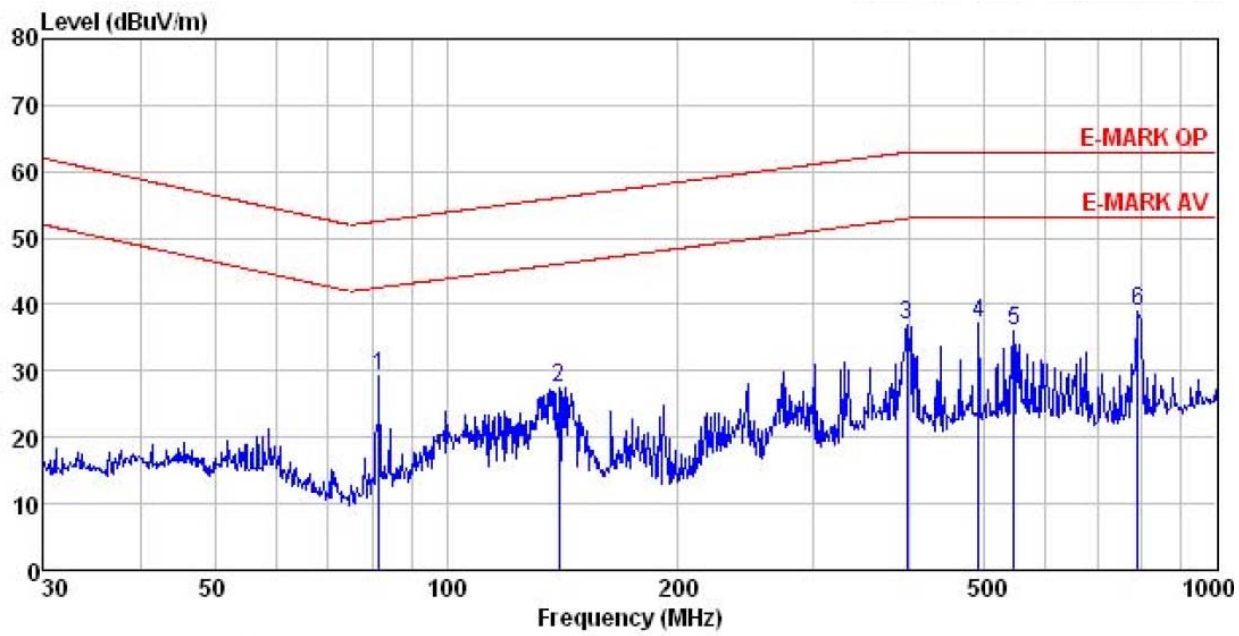
Vertical:



Site : 3m chamber
Condition : E-MARK QP 3m VULB9163(30M1G) VERTICAL
Job NO. : 225RF
Test mode : Communication mode
Power Rating : DC 12V
Environment : Temp:25.5°C Huni:55%
Test Engineer: Joe

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	81.783	54.48	9.28	1.72	30.12	35.36	52.57	-17.21	Peak
2	146.374	56.09	8.23	2.47	29.28	37.51	56.39	-18.88	Peak
3	273.234	49.70	12.46	2.87	29.52	35.51	60.50	-24.99	Peak
4	332.519	52.14	13.86	3.04	29.60	39.44	61.79	-22.35	Peak
5	393.472	52.71	14.92	3.08	29.87	40.84	62.89	-22.05	Peak
6	793.396	47.97	19.96	4.35	30.42	41.86	63.00	-21.14	Peak

Horizontal:



Site : 3m chamber
Condition : E-MARK QP 3m VULB9163(30M1G) HORIZONTAL
Job NO. : 225RF
Test mode : Communication mode
Power Rating : DC 12V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: Joe

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	81.783	48.29	9.28	1.72	30.12	29.17	52.57	-23.40	Peak
2	139.851	46.38	8.19	2.39	29.38	27.58	56.09	-28.51	Peak
3	396.242	48.72	14.97	3.08	29.88	36.89	62.94	-26.05	Peak
4	490.745	47.77	16.39	3.54	30.52	37.18	63.00	-25.82	Peak
5	545.183	45.19	17.46	3.86	30.54	35.97	63.00	-27.03	Peak
6	790.619	44.99	19.96	4.35	30.43	38.87	63.00	-24.13	Peak

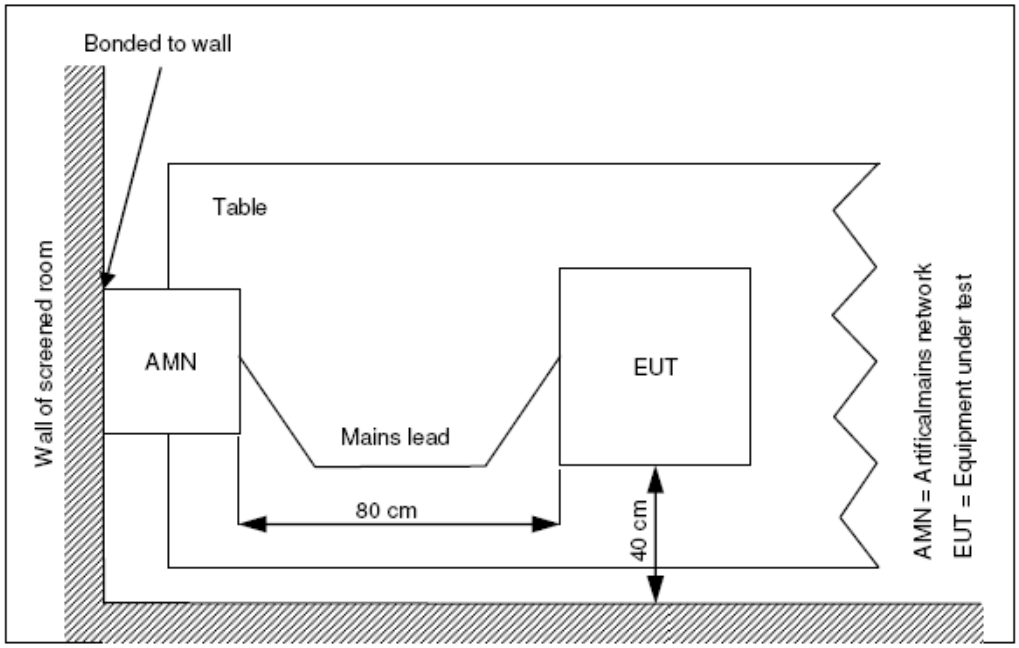
7.1.2 Conducted Emission

Test Method:	ETSI EN 301 489-1 clause 8.3.2 (EN 55022)						
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)						
	Quasi-Peak if maximized peak within 6dB of Quasi-Peak limit						
EUT Operation:							
Ambient:	Temp.: 23	°C,	Humid.: 56	%	Press.:	101	kPa
Measurement Record:	Uncertainty: 3.28dB						
Test mode:	OP1, OP2, OP3, OP4						
Test setup:	SET						
Test procedure:	Pre-scan the above modes on SET, and found the worst case mode which was OP1. The below data is test data of the worst mode.						

Limit:

Frequency	Emission level (Limit)	
	Quasi-peak	Average
0,15 – 0,5 MHz	66 – 56 dBµV	56 – 46 dBµV
0,5 – 5 MHz	56 dBµV	46 dBµV
5 – 30 MHz	60 dBµV	50 dBµV

Test Configuration:

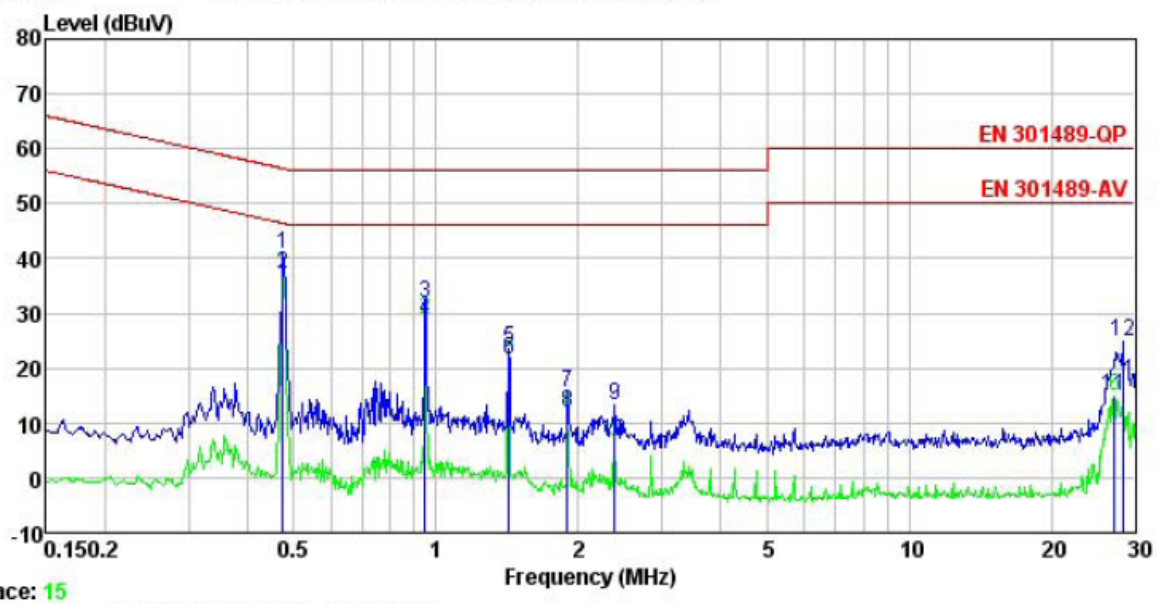


Test Result and Partial Measurement Data

Pass

Test mode:	OP1	Test setup:	SET	

Positive:

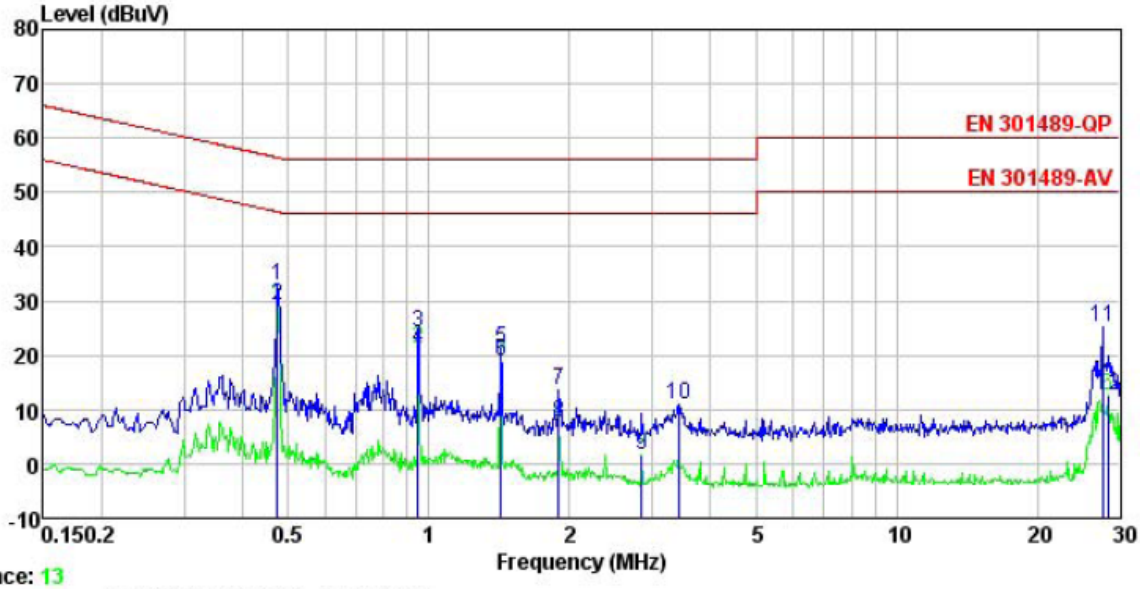


Trace: 15

```
Site          : CCIS Conducted test Site
Condition     : EN 301489-QP LISN
Job. no       : 225RF
Test Mode     : communication mode
Power Rating  : DC 12V
Environment   : Temp: 23 'C Huni:56%  Atmos:101KPa
Test Engineer: Joe
Remark        : +
```

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.474	40.14	0.00	0.75	40.89	56.45	-15.56	QP
2	0.474	36.45	0.00	0.75	37.20	46.45	-9.25	Average
3	0.948	30.90	0.00	0.85	31.75	56.00	-24.25	QP
4	0.948	28.02	0.00	0.85	28.87	46.00	-17.13	Average
5	1.426	22.66	0.00	0.92	23.58	56.00	-32.42	QP
6	1.426	20.71	0.00	0.92	21.63	46.00	-24.37	Average
7	1.898	14.47	0.00	0.95	15.42	56.00	-40.58	QP
8	1.898	10.98	0.00	0.95	11.93	46.00	-34.07	Average
9	2.384	12.15	0.00	0.94	13.09	56.00	-42.91	QP
10	2.384	5.75	0.00	0.94	6.69	46.00	-39.31	Average
11	27.127	13.92	0.00	0.87	14.79	50.00	-35.21	Average
12	28.302	24.13	0.00	0.87	25.00	60.00	-35.00	QP

Negative:



Trace: 13

Site : CCIS Conducted test Site
Condition : EN 301489-QP LISN
Job. no : 225RF
Test Mode : communication mode
Power Rating : DC 12V
Environment : Temp: 23 'C Huni:56% Atmos:101KPa
Test Engineer: Joe
Remark : -

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.474	31.97	0.00	0.75	32.72	56.45	-23.73	QP
2	0.474	28.46	0.00	0.75	29.21	46.45	-17.24	Average
3	0.948	23.22	0.00	0.85	24.07	56.00	-31.93	QP
4	0.948	20.20	0.00	0.85	21.05	46.00	-24.95	Average
5	1.426	20.25	0.00	0.92	21.17	56.00	-34.83	QP
6	1.426	17.94	0.00	0.92	18.86	46.00	-27.14	Average
7	1.898	12.58	0.00	0.95	13.53	56.00	-42.47	QP
8	1.898	6.55	0.00	0.95	7.50	46.00	-38.50	Average
9	2.854	0.63	0.00	0.92	1.55	46.00	-44.45	Average
10	3.417	10.12	0.00	0.91	11.03	56.00	-44.97	QP
11	27.562	24.48	0.00	0.87	25.35	60.00	-34.65	QP
12	28.302	11.72	0.00	0.87	12.59	50.00	-37.41	Average

7.2 EMS (Immunity) test results

7.2.1 Performance Criteria

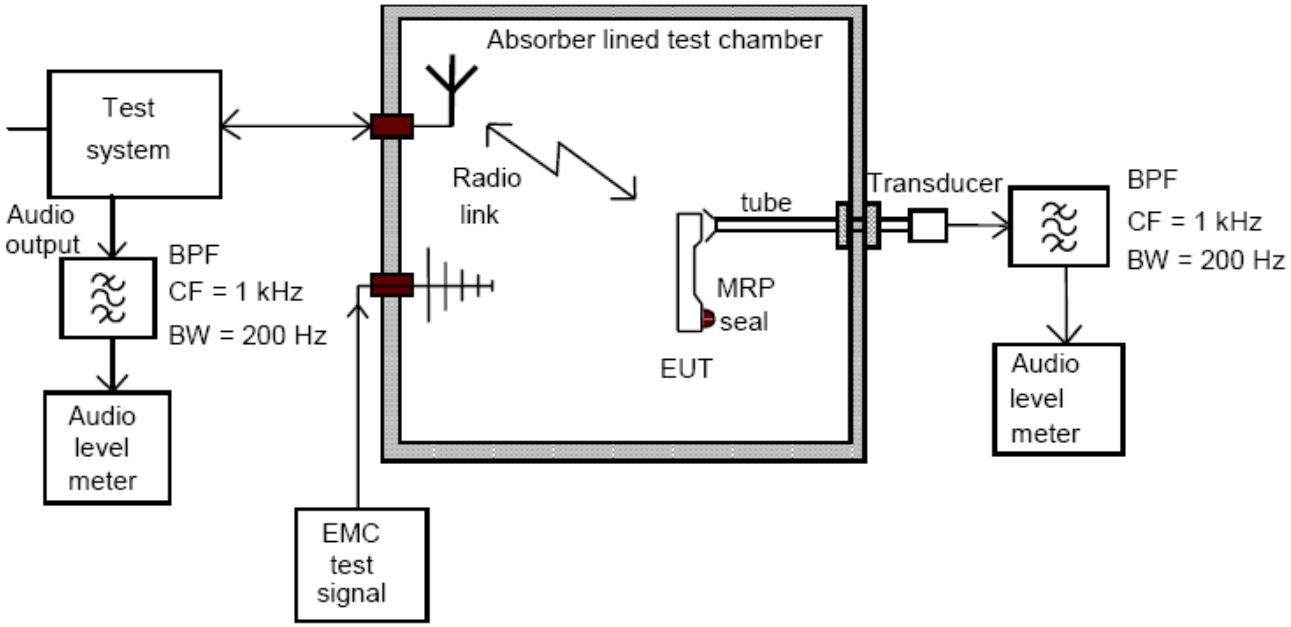
ETSI EN 301 489-7 V1.3.1 (2005-11) 6.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)	During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.
ETSI EN 301 489-7 V1.3.1 (2005-11) 6.2 Performance criteria for Transient phenomena applied to Transmitters (TT)	At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.
ETSI EN 301 489-7 V1.3.1 (2005-11) 6.3 Performance criteria for Continuous phenomena applied to Receivers (CR)	During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence. During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check). At the conclusion of the test, the EUT shall operate as intended with no loss of user control the The communication link shall have been maintained.

ETSI EN 301 489-7 V1.3.1 (2005-11) 6.4 Performance criteria for Transient phenomena applied to Receivers (TR)	At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained
ETSI EN 301 489-7 V1.4.1 (2005-11) 6.5 Performance criteria for ancillary equipment tested on a stand alone basis	If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in the clauses above are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation.

7.2.2 Radiated Immunity (80MHz to 1GHz & 1.4GHz to 2.7GHz)

7.2.2.1 Traffic mode

Test Set -up



Test Plan & Condition

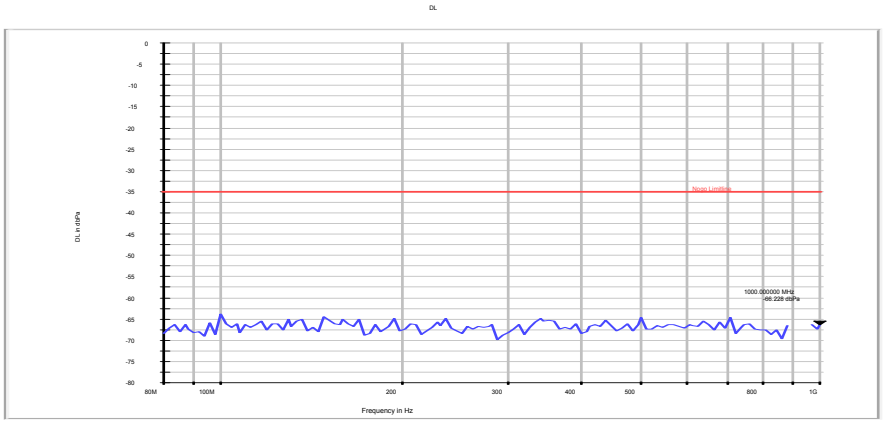
EMI Phenomenon	Frequency range	EUT Face	Immunity level	Basic standard	Operating Mode	EUT Set-up	Reaction Of EUT	Result
Radiated Interference Field Strength	80- 1000MHz 1400-2700MHz	Front Rear Left Right Top Bottom	3 V/m; 1kHz; 80% AM Dwell time 3s	EN 61000-4-3	OP1,OP3,	SET	A	Pass

Reaction of EUT:
A normal performance within the specification limits
Remark: The Right direction is the worst case

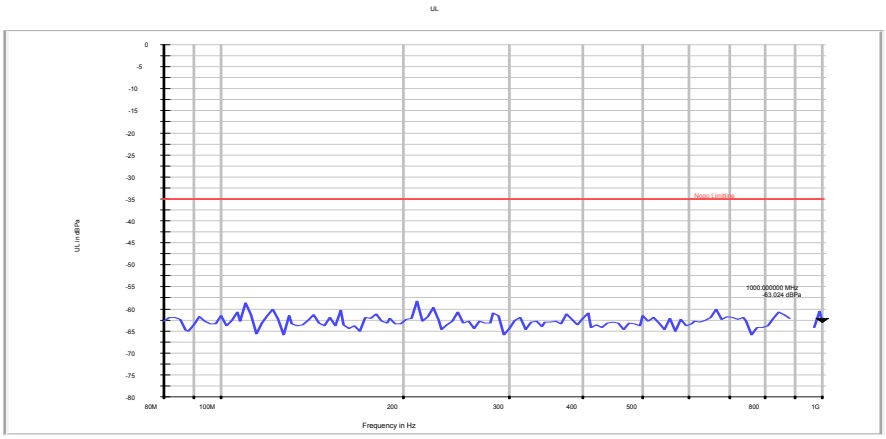
Test mode:	OP1	Test setup:	SET	Test Frequency:	80MHz-1GHz

Horizontal:

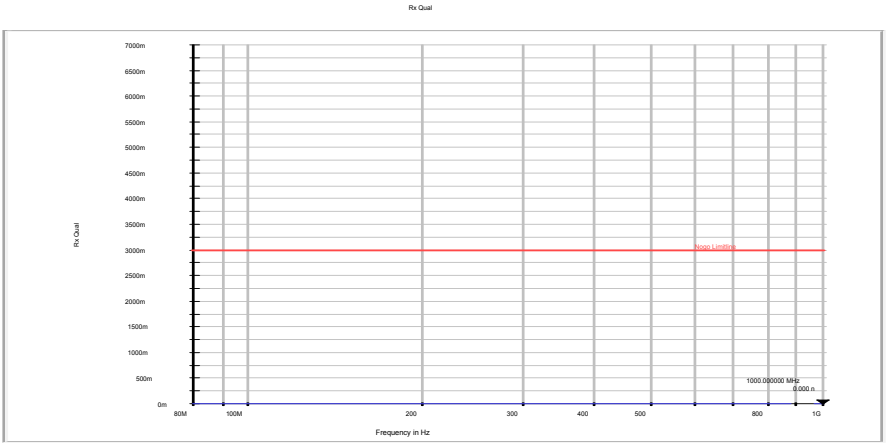
Down Link:



Up Link:

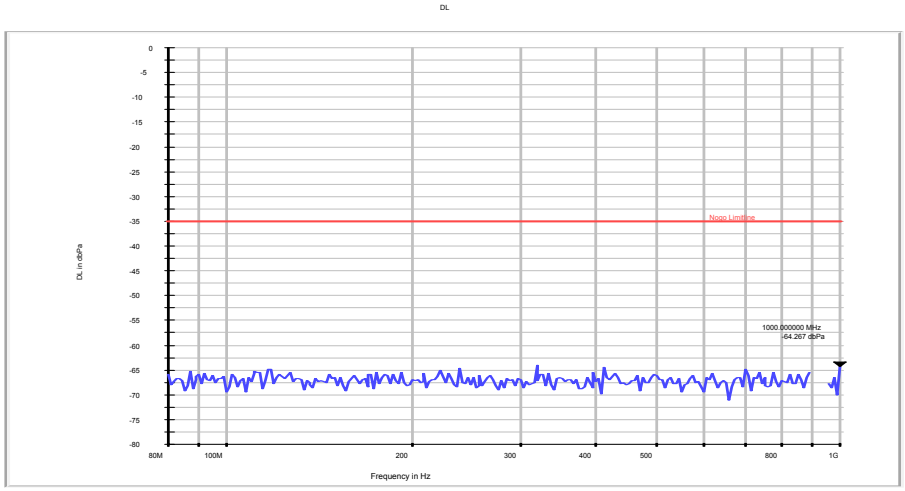


RXQ:

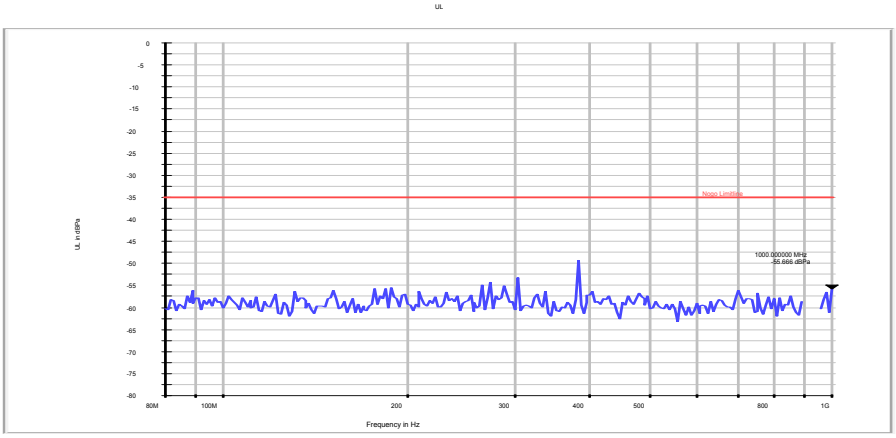


Vertical:

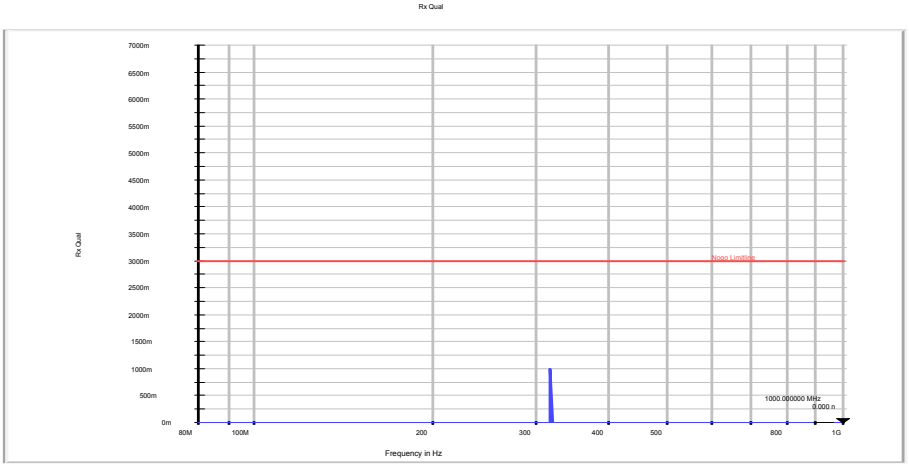
Down Link:



Up Link:



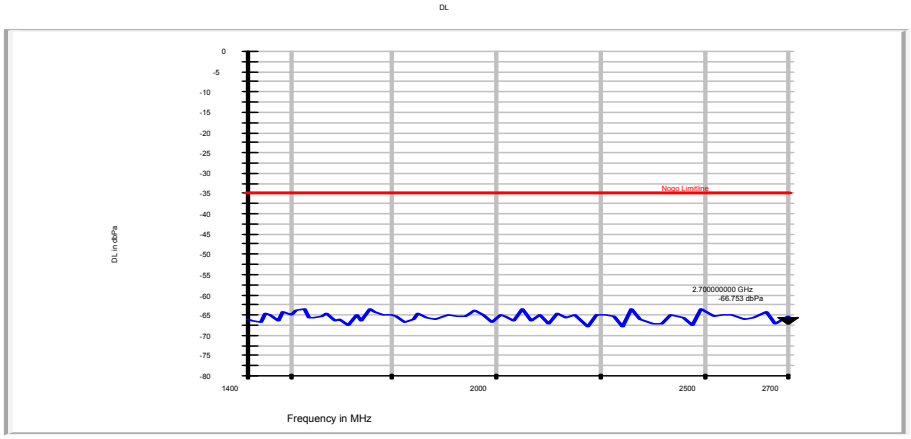
RXQ:



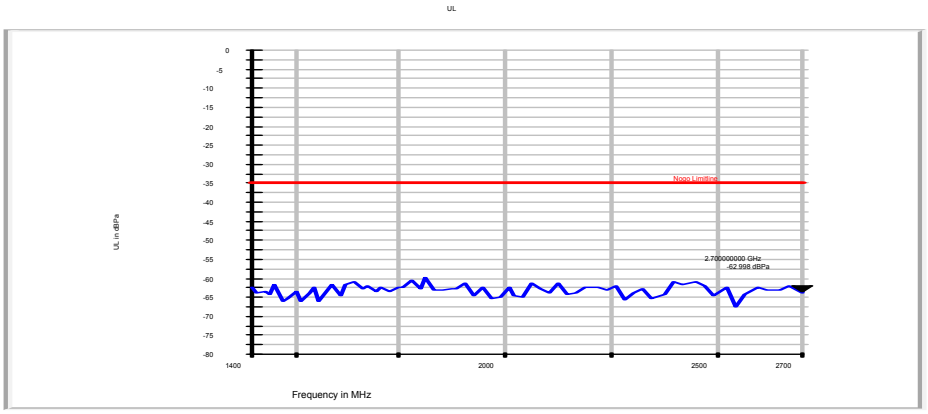
Test mode:	OP1	Test setup:	SET	Test Frequency:	1.4GHz-2.7GHz

Horizontal:

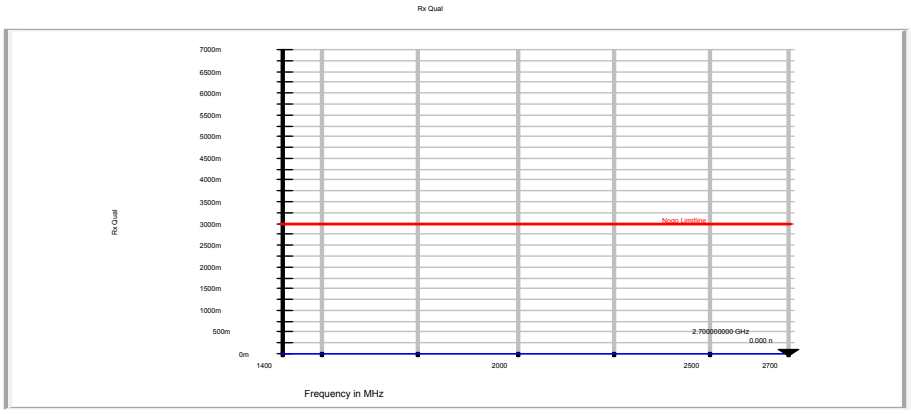
Down Link:



Up Link:

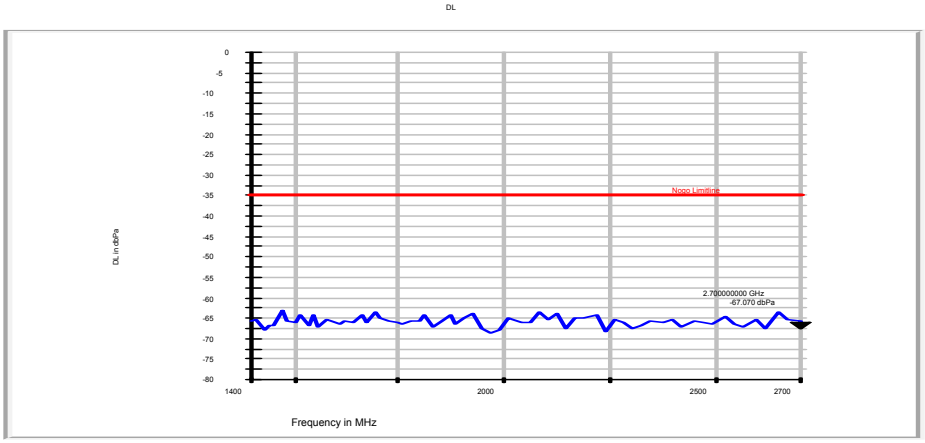


RXQ:

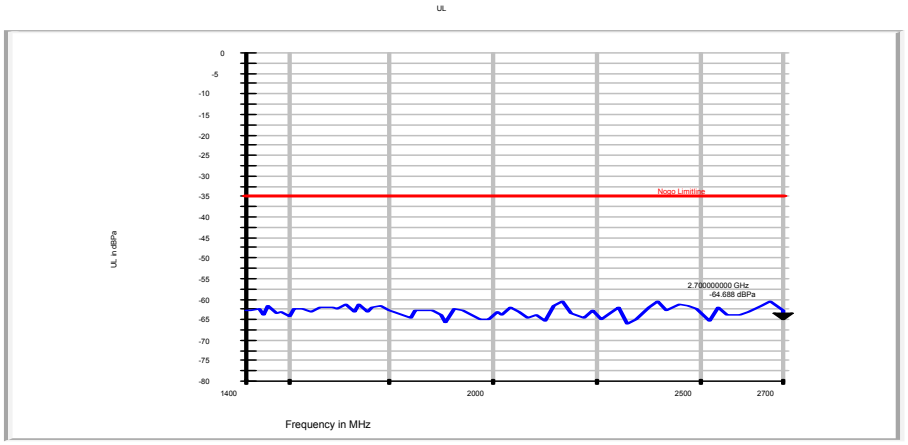


Vertical:

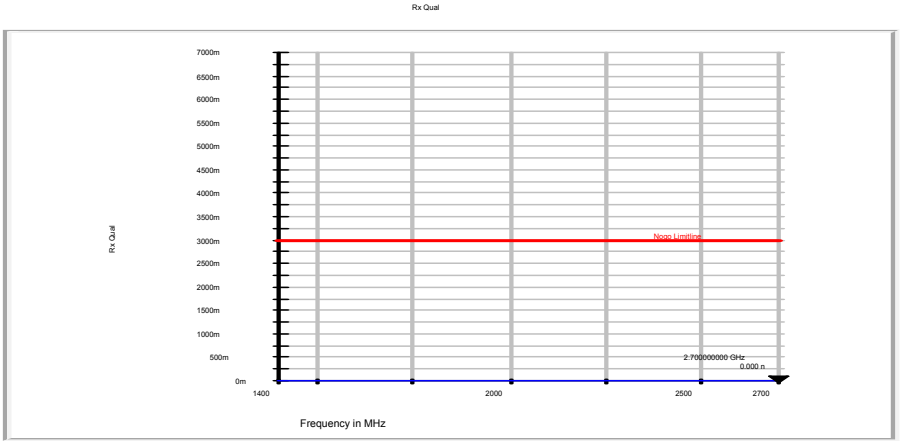
Down Link:



Up Link:



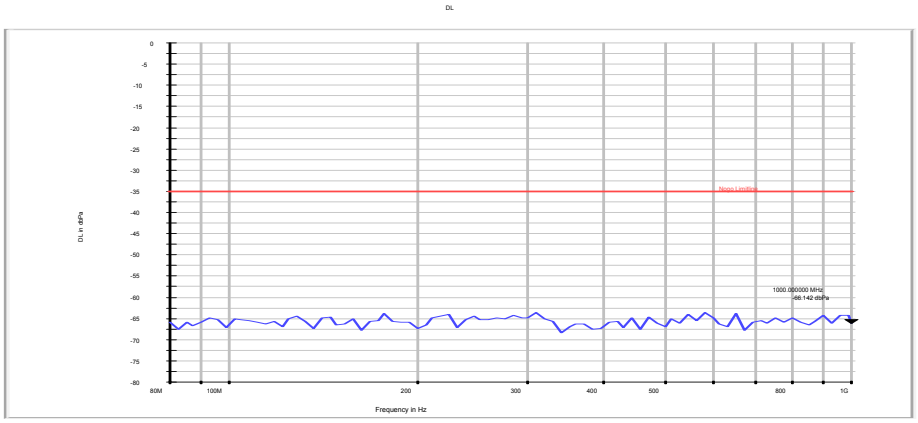
RXQ:



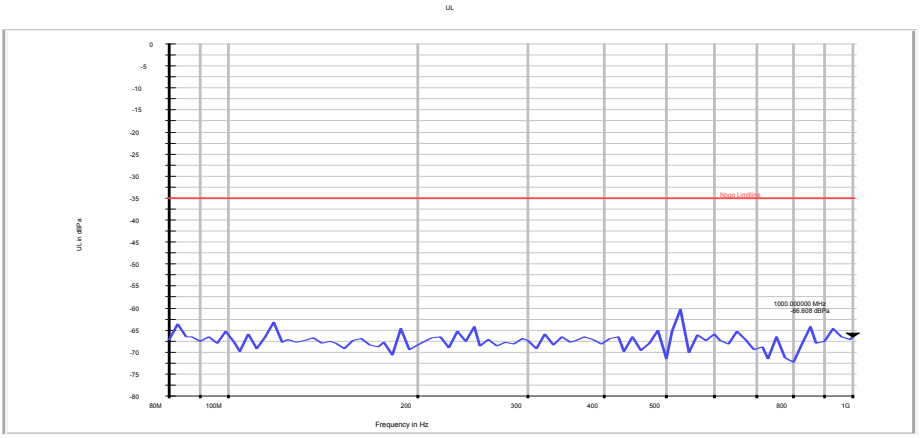
Test mode:	OP3	Test setup:	SET	Test Frequency:	80MHz-1GHz

Horizontal:

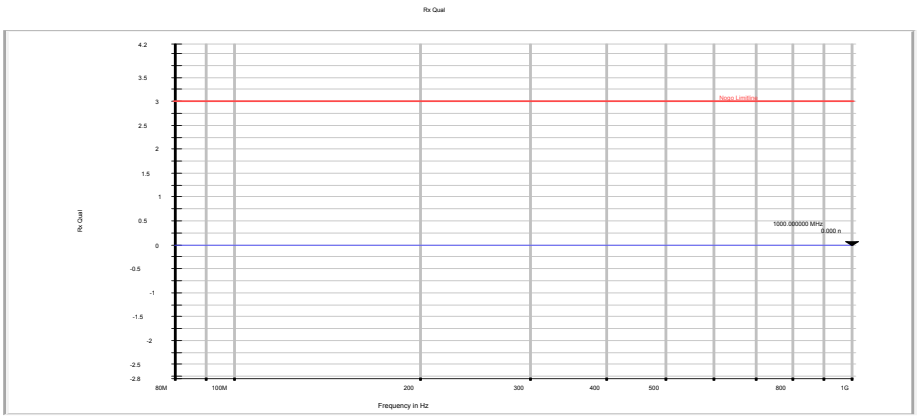
Down Link:



Up Link:

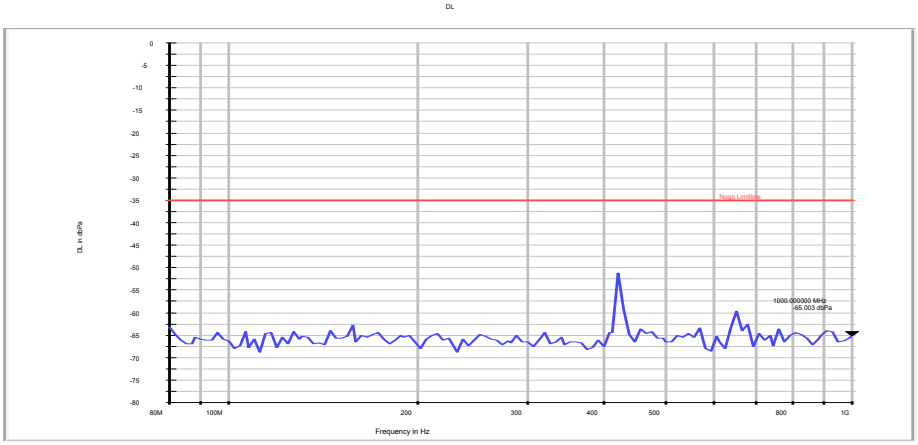


RXQ:

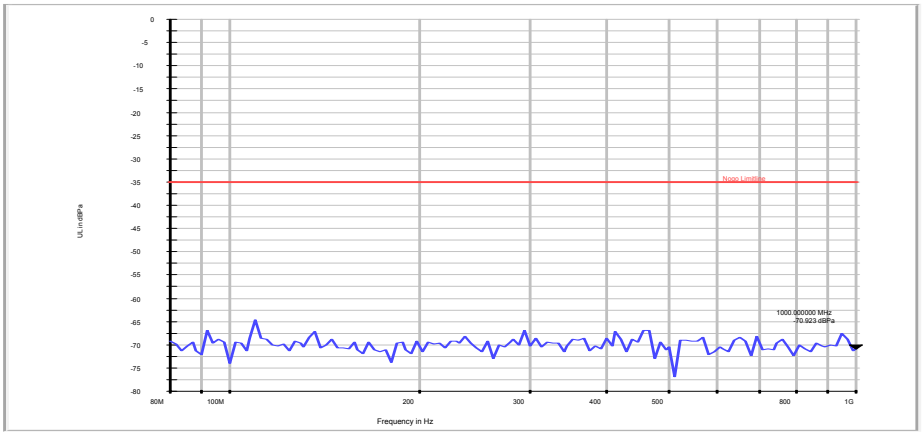


Vertical:

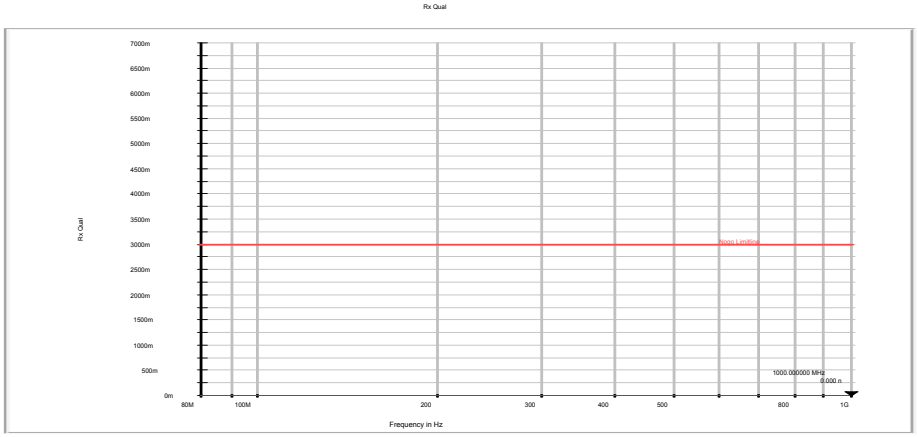
Down Link:



Up Link:



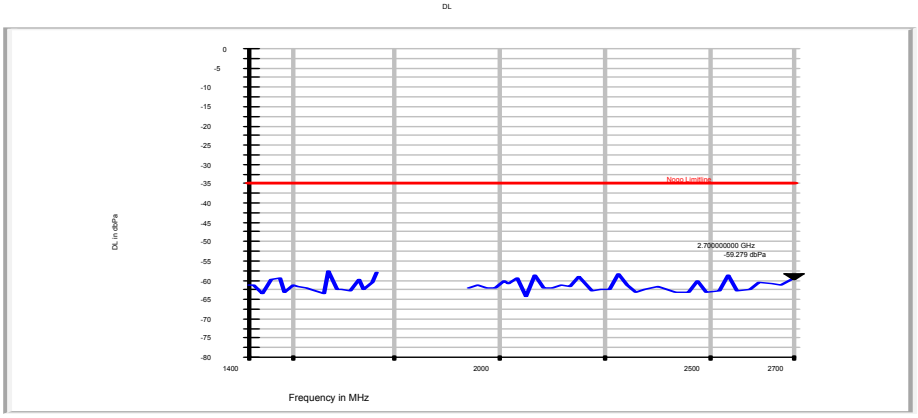
RXQ:



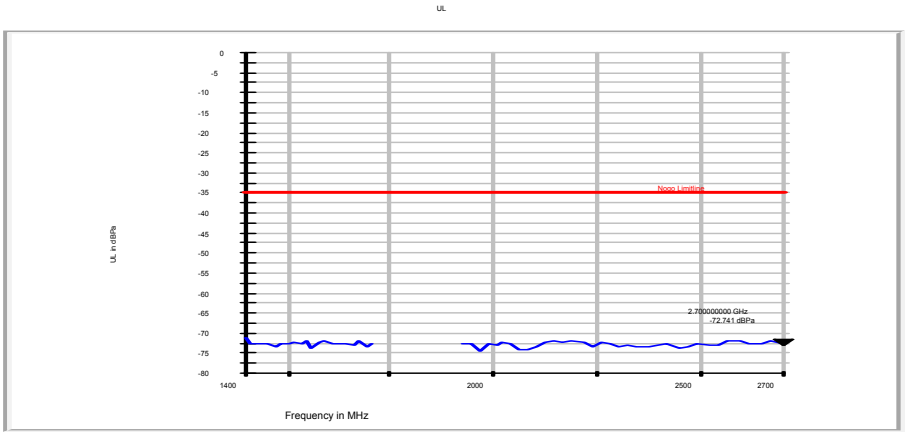
Test mode:	OP3	Test setup:	SET	Test Frequency:	1.4GHz-2.7GHz

Horizontal:

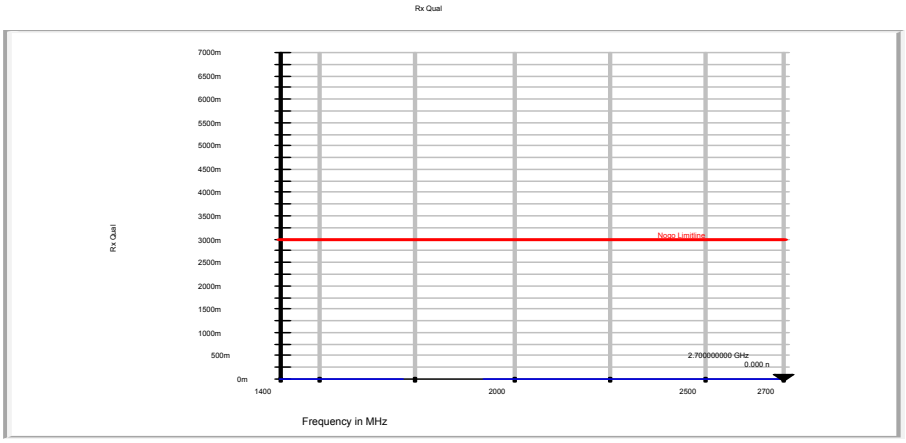
Down Link:



Up Link:

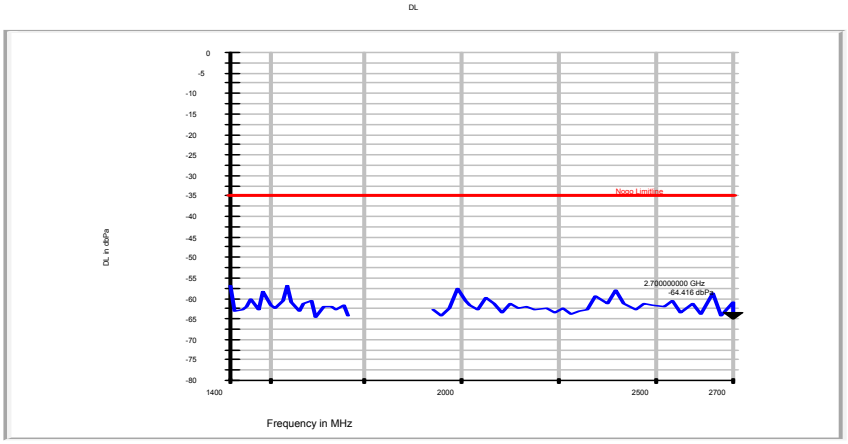


RXQ:

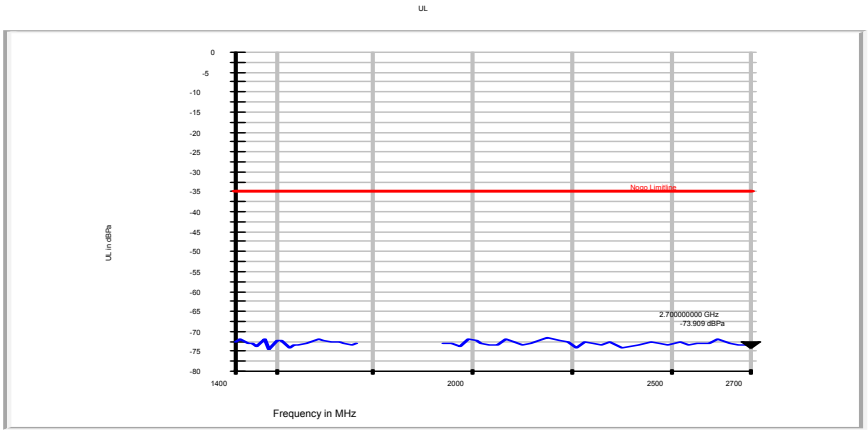


Vertical:

Down Link:



Up Link:



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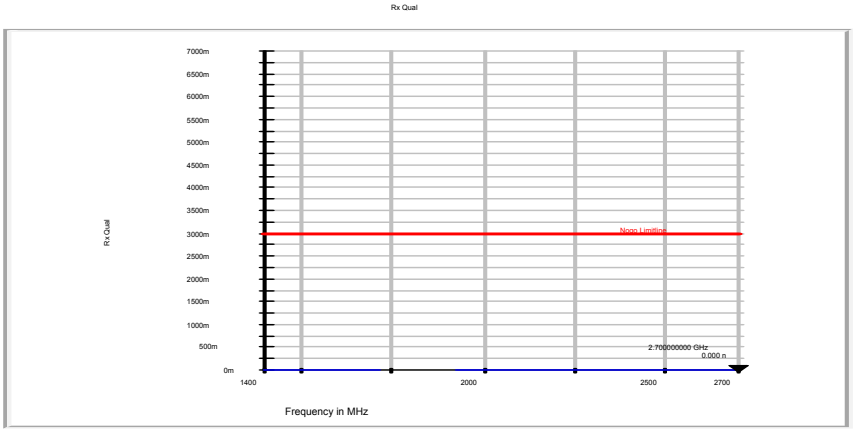


7.2.2.2 Idle mode

Test procedure:

The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.

Test monitor:

BCCH and CCCH

Test Plan & Condition

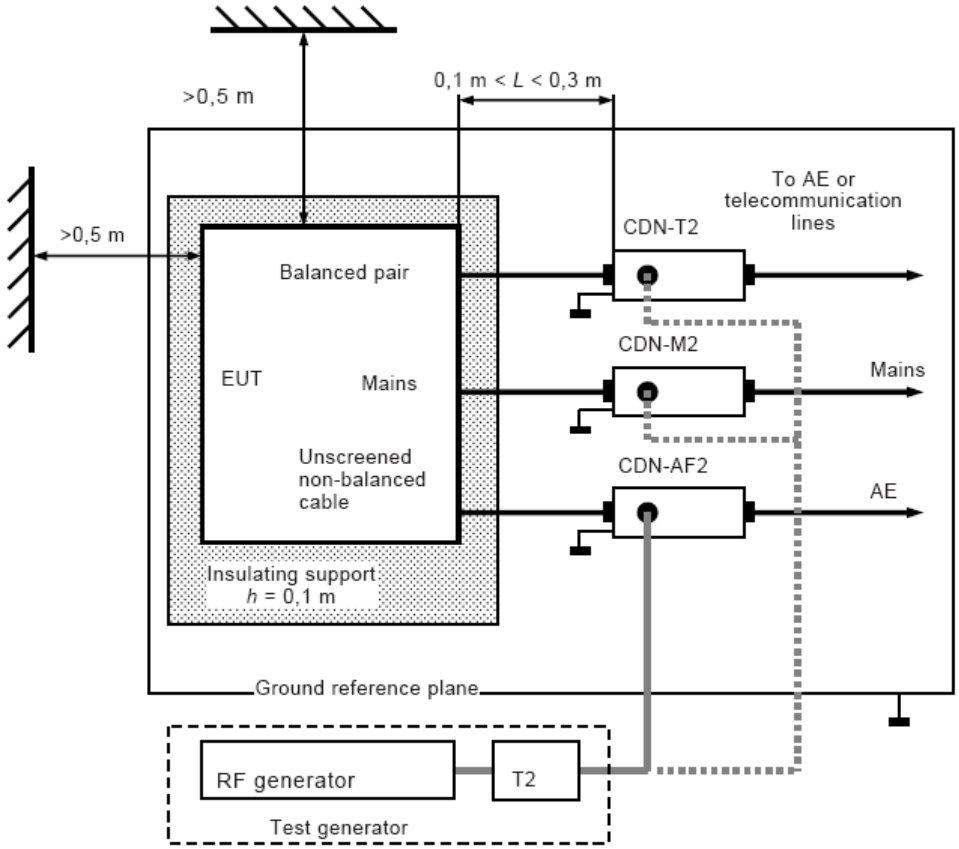
EMI Phenomenon	Frequency range	Immunity level	Basic standard	Operating Mode	EUT Set-up	Reaction of EUT	Result
Radiated Interference Field Strength	80 – 1000MHz 1400 – 2700MHz	3 V/m; 1 kHz; 80% AM Dwell time 3s	EN 61000-4-3	OP2, OP4,	SET	A	Pass

Reaction of EUT:
A normal performance within the specification limits

7.2.3 Radio frequency common mode

7.2.3.1 Traffic mode

Test Set-up



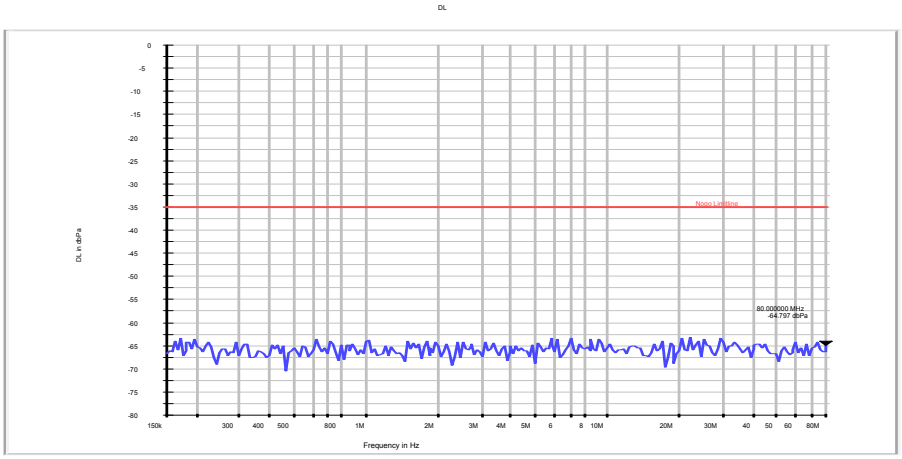
Test Plan & Condition:

EMI Phenomenon	Frequency range	Immunity level	Basic standard	Operating Mode	EUT Set-up	Reaction of EUT	Result
Radio-frequency common mode	0,15 – 80 MHz	3 V/m; 1 kHz; 80% AM dwell time 3s	EN 61000-4-6	OP1, OP3,	SET	A	Pass

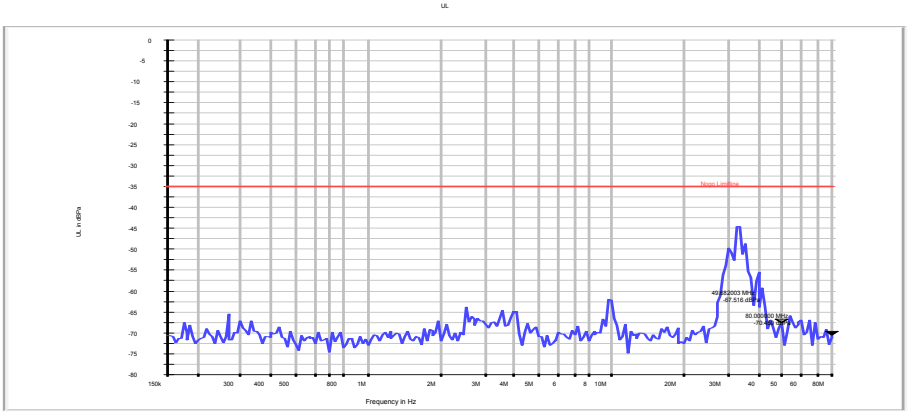
Reaction of EUT:
A normal performance within the specification limits

Test mode:	OP1	Test setup:	SET	Test Frequency:	150KHz-80MHz

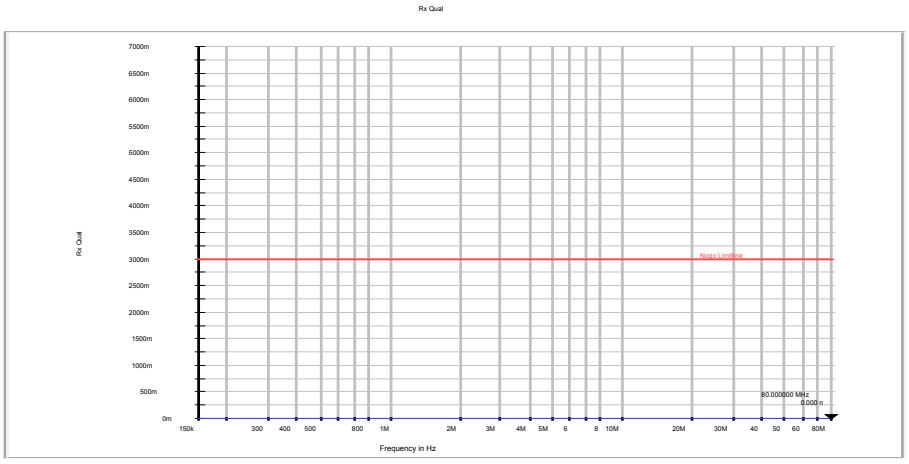
Down Link:



Up Link:

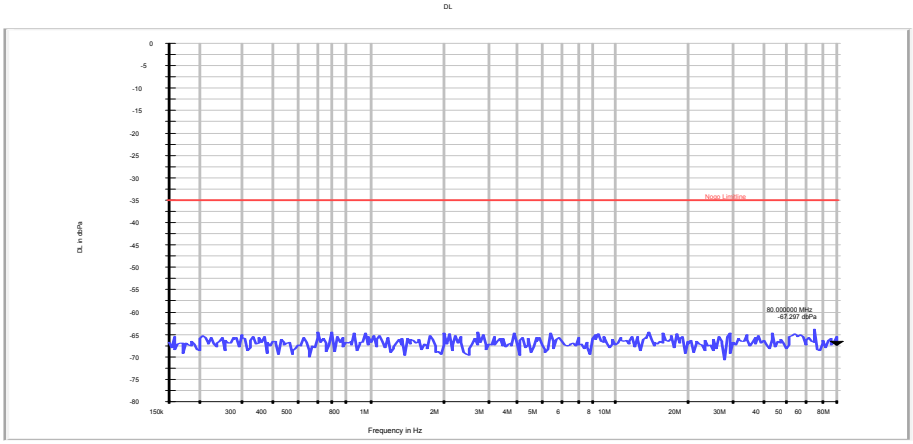


RXQ:

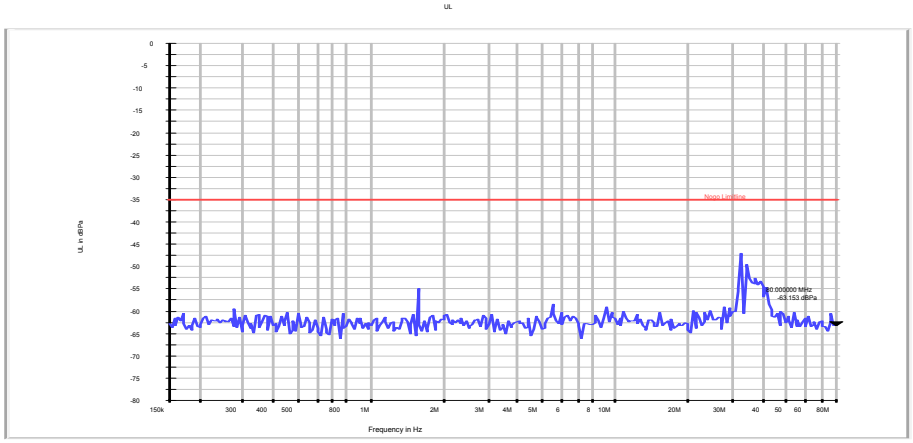


Test mode:	OP3	Test setup:	SET	Test Frequency:	150KHz-80MHz

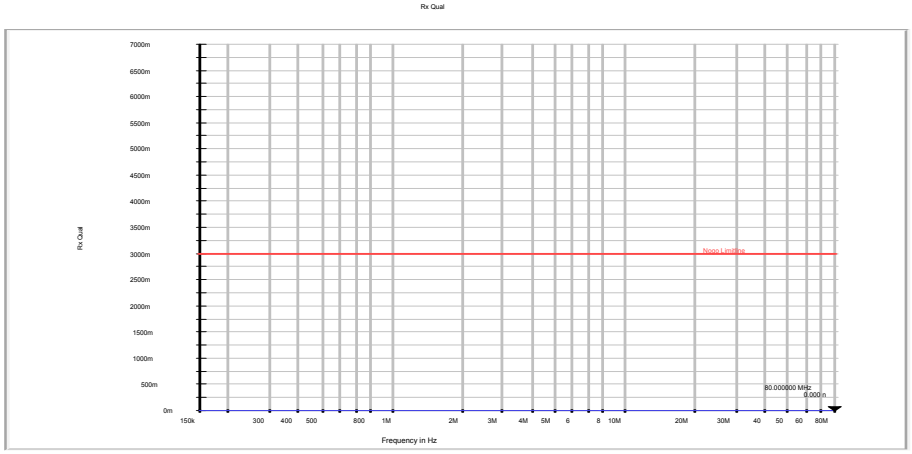
Down Link:



Up Link:



RXQ:



7.2.3.2 Idle mode

Test procedure:

The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.

Test monitor:

BCCH and CCCH

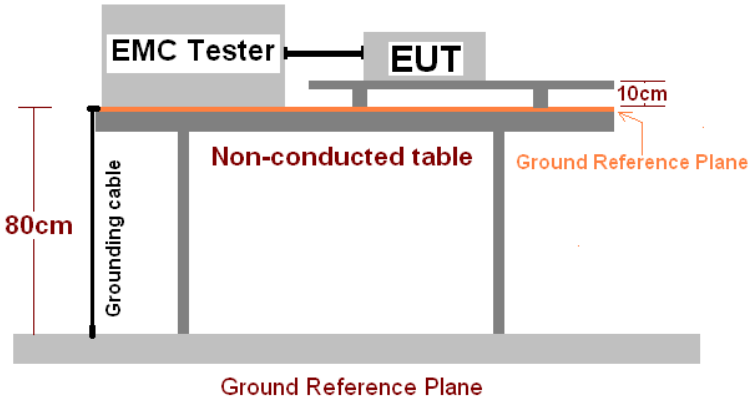
Test Plan & Condition:

EMI Phenomenon	Frequency range	Immunity level	Basic standard	Operating Mode	EUT Set-up	Reaction of EUT	Result
Radio-frequency common mode	0,15 – 80 MHz	3 V/m; 1 kHz; 80% AM dwell time 3s	EN 61000-4-6	OP2, OP4,	SET	A	Pass

Reaction of EUT:
A normal performance within the specification limits

7.2.4 Transients and surges in the vehicular environment

Test Set -up



Test Plan & Condition:

Pulse 1:	Level:	III
	Test level:	-75 V
	Number of pulses:	10
Pulse 2a:	Level:	III
	Test level:	+37 V
	Number of pulses:	10
Pulse 2b:	Level:	III
	Test level:	+10 V
	Number of pulses:	10
Pulse 3a:	Level:	III
	Test level:	-112 V
	Coupling duration:	20
Pulse 3b:	Level:	III
	Test level:	+75 V
	Coupling duration:	20
Pulse 4:	Level:	III
	Test level:	-6 V
	Number of pulses:	10

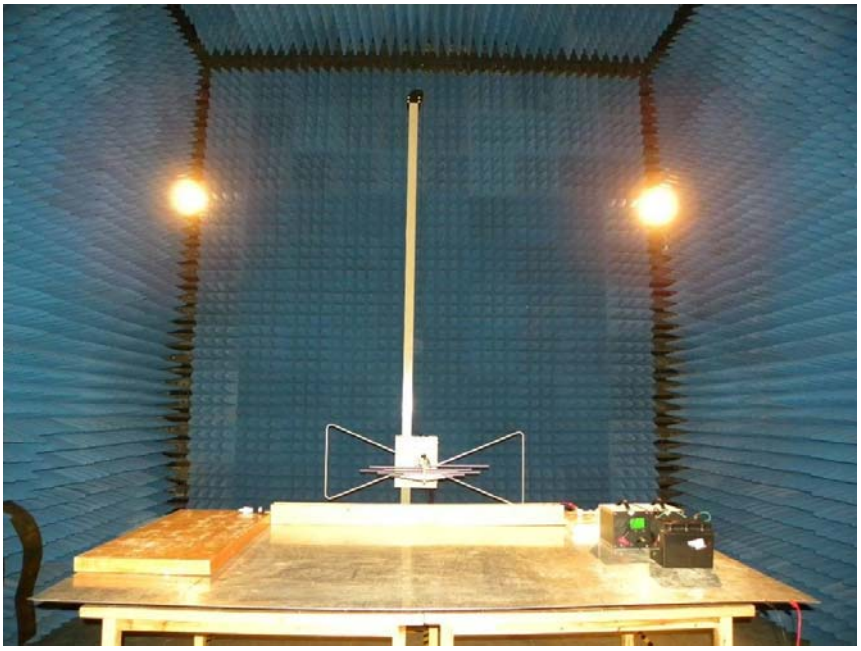
Test results:

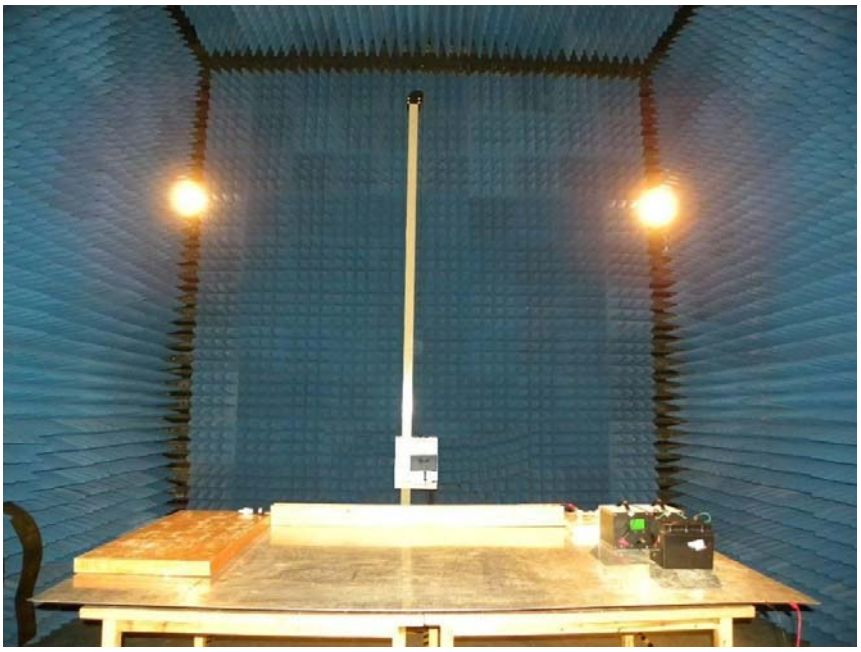
Test pulse number	Immunity test level	Required functional status	Functional status of the systems	Tested phenomenon
1	III	D	A	Work as normally
2a	III	D	A	Work as normally
2b	III	D	A	Work as normally
3a	III	D	A	Work as normally
3b	III	D	A	Work as normally
4	III	D	A	Work as normally

The requirements are **FULFILLED**.

8 Test Setup Photo

Radiated Emission



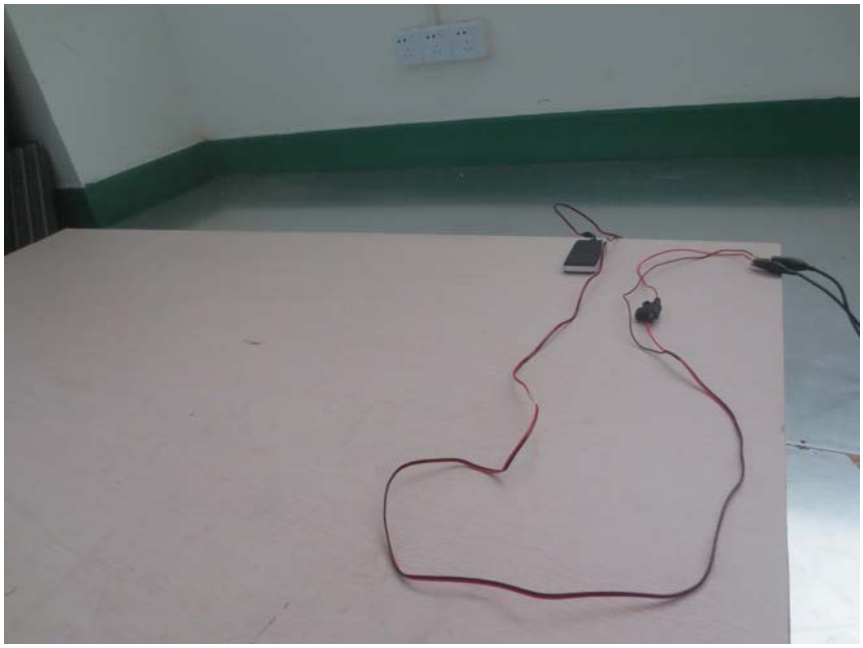


Conducted Emission

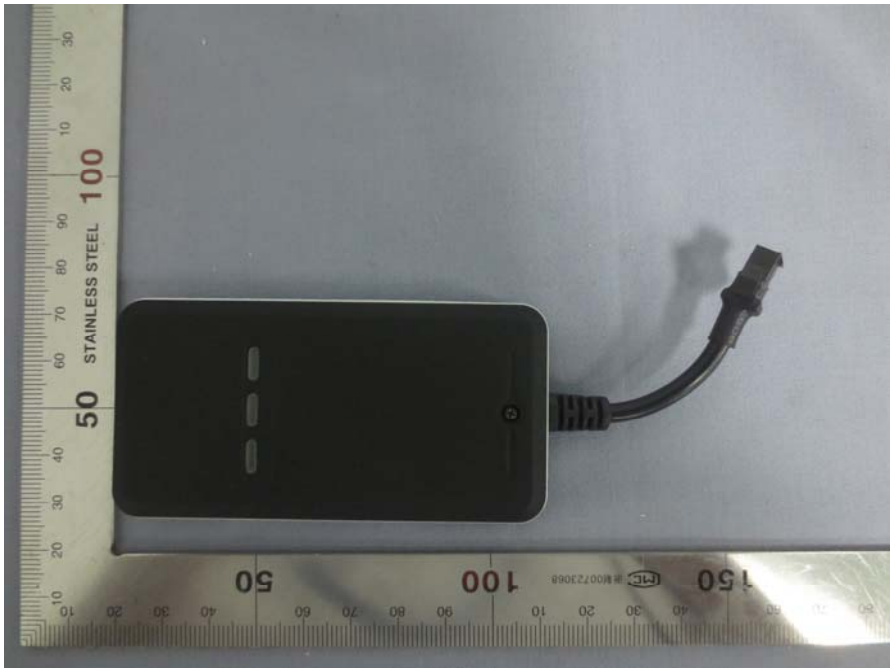
Surge

RS

CS



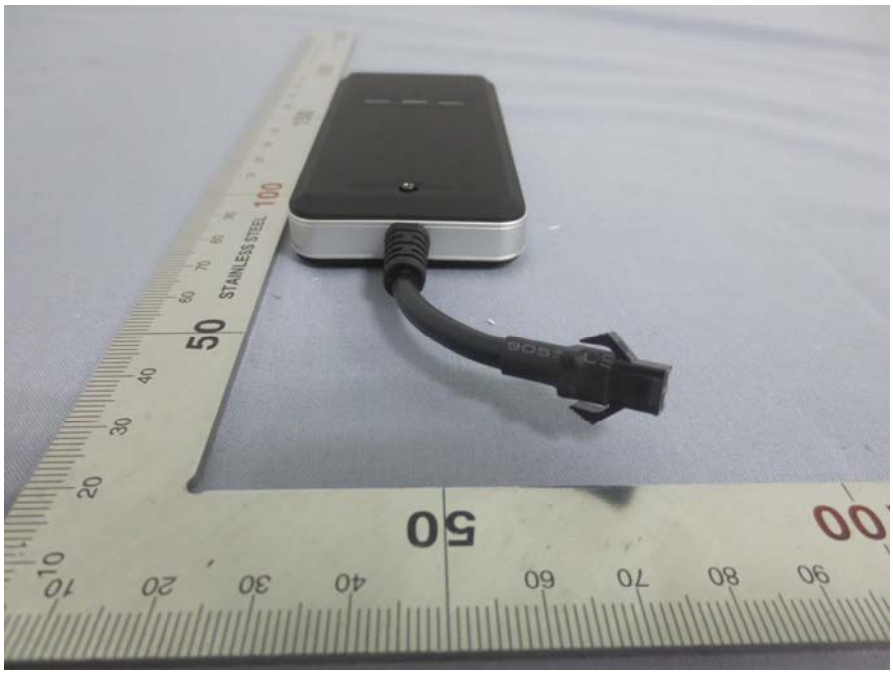
9 EUT Constructional Details

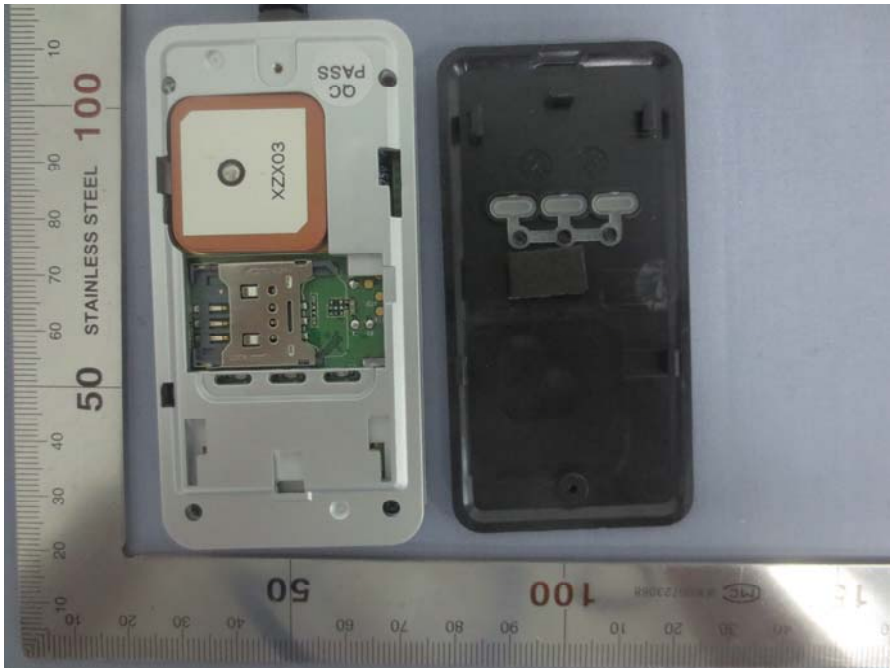

STAINLESS STEEL


STAINLESS STEEL

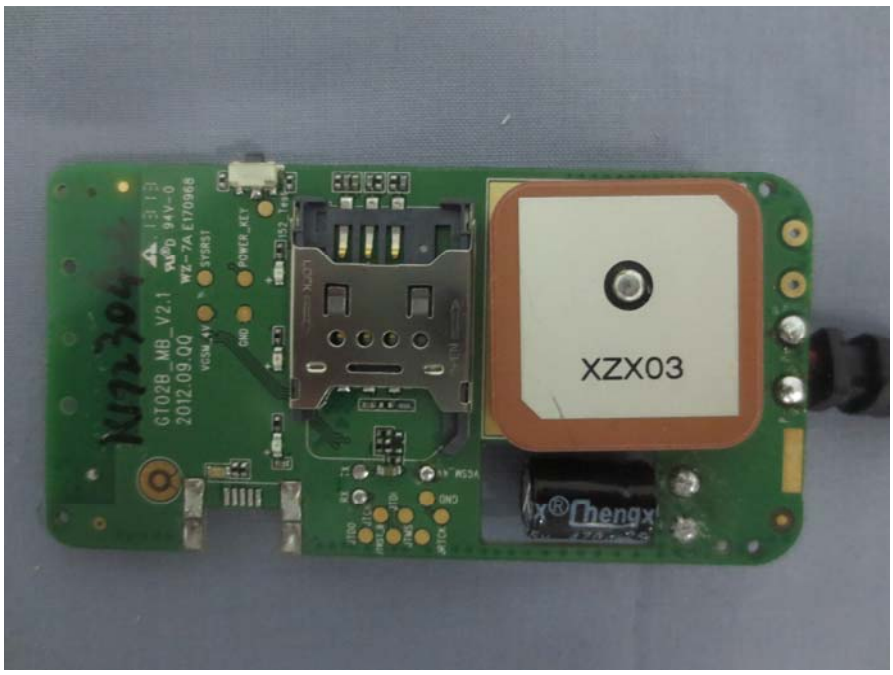

STAINLESS STEEL
50
100

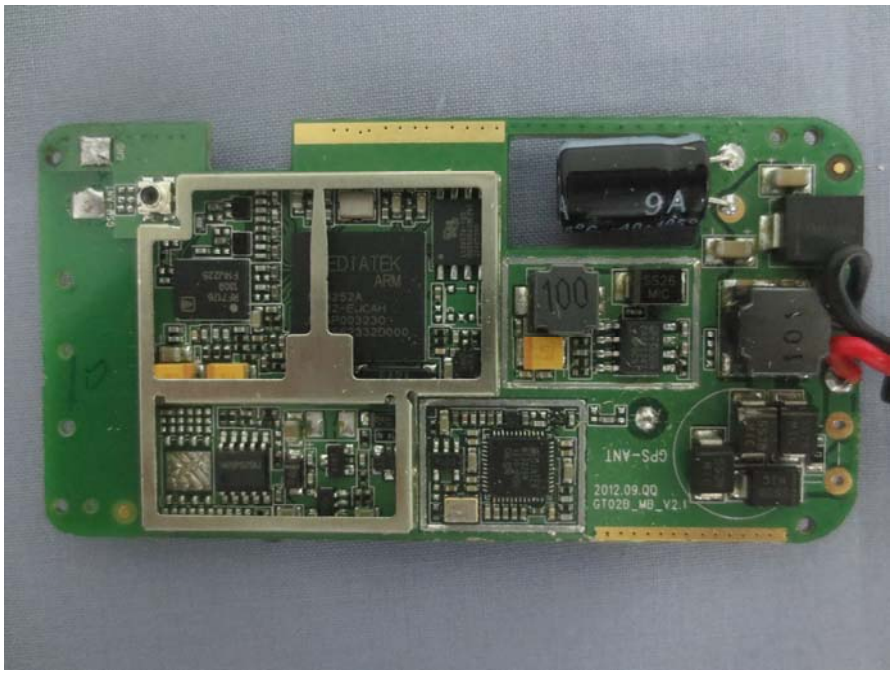

STAINLESS STEEL
50

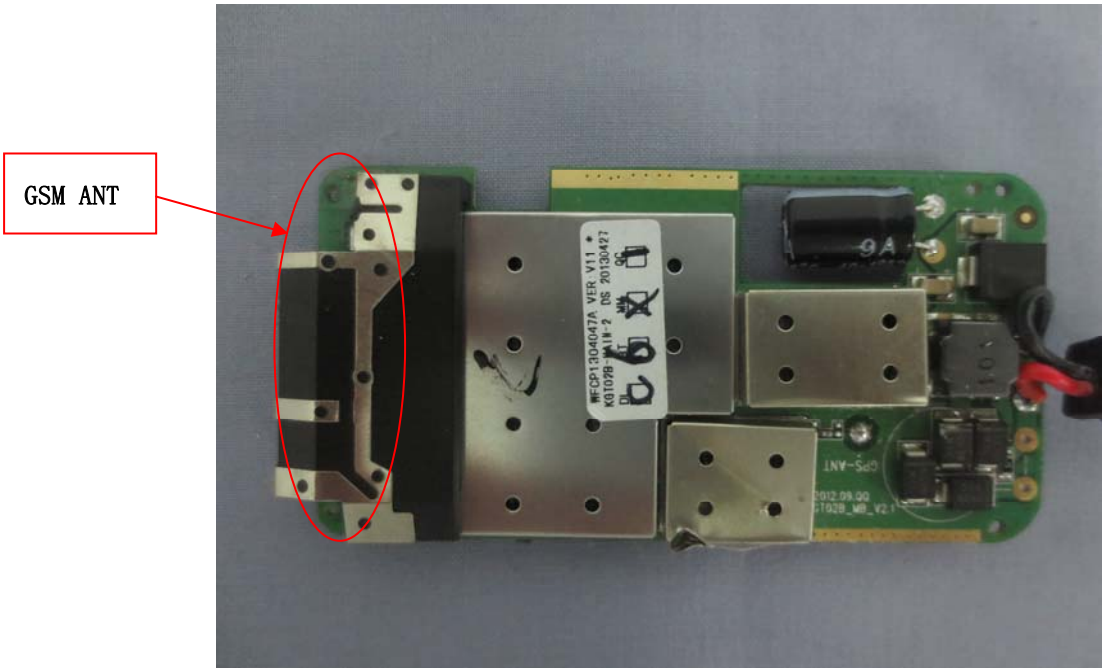



PASS
QC
XZX03
STAINLESS STEEL
50
100


XZX03


XZX03
GT02B_MB_V2.1
2012.09.00


9A
GPS-ANT
2012.09.00
GT02B_MB_V2.1



------End of report-----