EMC REPORT

Applicant:	Pointer Telocation Inc.
Address of Applicant:	Pointer Telocation 7751 NW 48th street suite 395 Doral Florida 33166 Doral USA
Manufacturer/Factory:	Pointer Telocation Inc.
Address of Manufacturer/Factory:	Pointer Telocation 7751 NW 48th street suite 395 Doral Florida 33166 Doral USA

Equipment Under Test (EUT)

Product Name:	Cello Family
Model No.:	Cello-CANiQ K-line - CT7800136-000, Cello-IQ - CT7800123-000, Cello-CANiQ- CT7800137-000, Cello CANiQ (DTCO) - CT7800138-000
Trade Mark:	Pointer
Applicable standards:	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Draft ETSI EN 301 489-19 V2.1.0 (2017-03) Draft ETSI EN 301 489-52 V1.1.0 (2016-11)
Date of sample receipt:	July 03, 2018
Date of Test:	July 04- August 19, 2018
Date of report issue:	August 20, 2018
Test Result :	PASS *

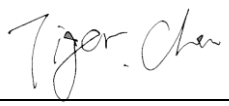
* In the configuration tested, the EUT complied with the standards specified above.

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 2014/53/EU are considered.

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*August 19, 2018*	*Original*

Prepared By:  ***Date:*** *August 20, 2018*

Project Engineer

Check By:  ***Date:*** *August 20, 2018*

Reviewer

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4 Test Summary

EMI Test				
Test Item	Test Requirement	Test Method	Application	Result
Radiated Emission	ETSI EN 301 489-19 ETSI EN 301 489-52	ETSI EN301 489-1	Enclosure	Pass
Conducted Emission	ETSI EN 301 489-19 ETSI EN 301 489-52	ETSI EN301 489-1	AC port/ Signal Port	Pass
Harmonic Current Emissions	ETSI EN 301 489-19 ETSI EN 301 489-52	ETSI EN301 489-1	AC port	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-19 ETSI EN 301 489-52	ETSI EN301 489-1	AC port	N/A
EMS Test				
ESD (Electrostatic Discharge)	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-2	Enclosure	Pass
Radio frequency electromagnetic field (80 MHz to 6 000 MHz)	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-3	Enclosure	Pass
EFT (Electrical Fast Transients	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-4	AC port	N/A
Surge Immunity	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-5	AC port	N/A
Radio frequency, common mode	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-6	AC port	N/A
Voltage Dips and Interruptions	ETSI EN 301 489-19 ETSI EN 301 489-52	EN 61000-4-11	AC port	N/A

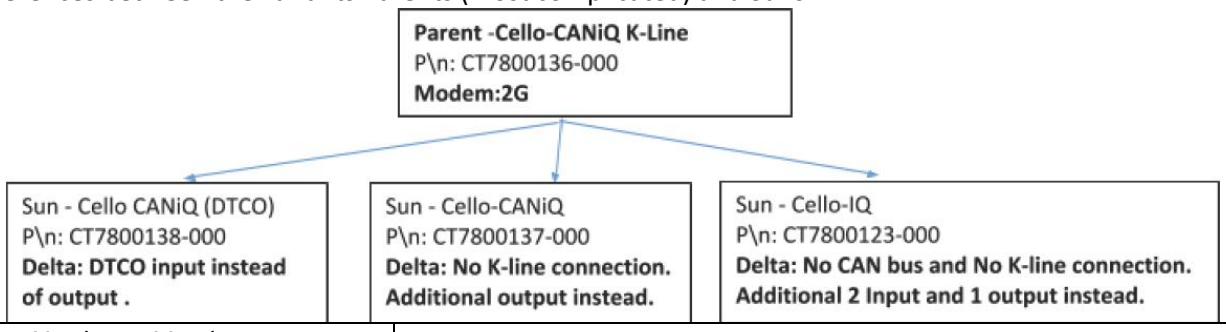
Remark:
Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 General Description of EUT

Product Name:	Cello Family
Model No.:	Cello-CANiQ K-line - CT7800136-000, Cello-IQ - CT7800123-000, Cello-CANiQ- CT7800137-000, Cello CANiQ (DTCO) - CT7800138-000
Test Model No:	Cello-CANiQ K-line - CT7800136-000

Differences between the variants Parents (most complicated) and Suns :



Hardware Version:	PB1031 REV-E
Software Version:	38
Support Networks:	GSM, GPRS, EGPRS
TX Frequency:	E-GSM900: 880---915MHz DCS1800: 1710---1785MHz
Modulation Type:	GSM/GPRS: GMSK EGPRS: GMSK/8PSK
Antenna Type:	Integral Antenna
Antenna Gain:	2.00dBi
EGPRS/GPRS Class:	Class 12
Power Supply:	DC 9-32V or DC 3.7V, 3.7Wh, 1000mAh by Lithium Ion Polymer Battery
GPS	
Operation Frequency:	L1: 1559MHz to 1610MHz

Information for accessories equipment

Battery	
Model:	711-20062
Power Rating:	DC 3.7V, 1000mAh, 3.7Wh
Manufacturer:	Howell Energy Co.,LTD
Address of Manufacturer:	B1010,Genzon Times Square, Longgang Center, Shenzhen, China.

5.2 Operating Modes

Operating mode	Detail description
GPS mode:	Keep the EUT in communicating mode on GPS function.
Traffic mode (GSM900)	Link + Power on (The EUT shall be commanded to operate at maximum transmit power.)
Idle mode (GSM900)	Idle + Power on (The EUT was registered in the mentioned band.)
Traffic mode (DCS1800)	Link + Power on (The EUT shall be commanded to operate at maximum transmit power.)
Idle mode (DCS1800)	Idle + Power on (The EUT was registered in the mentioned band.)

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
MEILI	DC POWER SUPPLY	MCH-305A	011121168
Lenovo	PC	N/A	N/A
DELL	KEYBOARD	SK-8115	GTS237-2
DELL	MOUSE	MOC5UO	GTS237-3

5.4 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383, January 08, 2018.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

5.5 Test Location

RS test was performed at:
SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab, No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.
All other tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

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	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

ESD						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	ESD Simulator	KIKUSUI	KES4021A	GTS242	June. 27 2018	June. 26 2019
2	Thermo meter	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019

Radiated Immunity (80MHz-6GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Fully-Anechoic Chamber 2	Chang Zhou Zhong Shuo	854	SEM001-05	2017-05-10	2020-05-09
Measurement Software	Rohde & Schwarz	EMC32 V9.25.00	N/A	N/A	N/A
Signal Generator	Rohde & Schwarz	SMB100A	SEM006-11	2018-04-02	2019-04-01
Broadband Amplifier (80MHz-1GHz)	Rohde & Schwarz	BBA150-BC250	SEM005-12	2017-09-27	2018-09-26
Broadband Amplifier (800MHz-3GHz)	Rohde & Schwarz	BBA150-D110	SEM005-13	2018-04-02	2019-04-01
Broadband Amplifier (2.5GHz-6GHz)	Rohde & Schwarz	BBA150-E60	SEM005-16	2018-04-13	2019-04-12
Power Sensor	Rohde & Schwarz	NRP-Z91	SEM009-09	2018-04-02	2019-04-01
Stacked Log.-Per.-Broadband Antenna(70MHz-10GHz)	Schwarzbeck	STLP 9129	SEM003-25	N/A	N/A
Amplifier(10kHz-250MHz)	Amplifier Research	75A250A	SEM005-11	2018-04-02	2019-04-01
Universal Radio Communication Tester	Rohde & Schwarz	CMU 200	SEM010-01	2017-09-27	2018-09-26
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2018-04-02	2019-04-01
Conditioning Amplifier	Brüel & Kjaer	2690-OS2	SEM005-10	2018-04-20	2019-04-19
Mouth Simulator	Brüel & Kjaer	4227	SEM017-01	2018-04-10	2019-04-09
Signal Source	Brüel & Kjaer	4231	SEM017-02	2018-04-14	2019-04-13
Audio Analyzer	Rohde & Schwarz	UPV	SEM008-03	2017-09-27	2018-09-26

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	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

7 EMC Requirements Specification in ETSI EN 301 489-52

7.1 EMI (Emission)

7.1.1 Radiated Emission

Test Requirement:	ETSI EN 301 489-19/-52
Test Method:	ETSI EN 301 489-1 and EN 55016-2-3
Test Frequency Range:	30MHz to 6GHz
Test site:	Measurement Distance: 3m

Receiver setup:

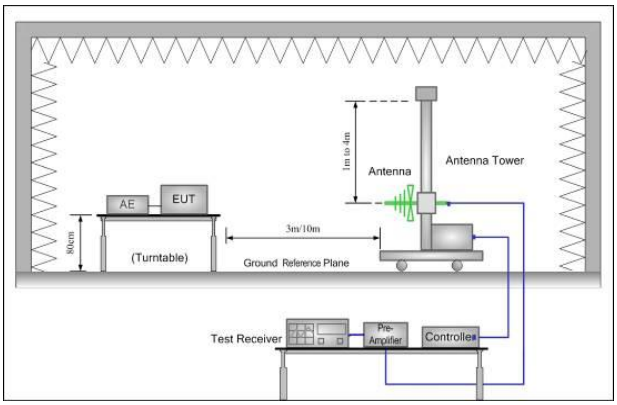
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	100kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

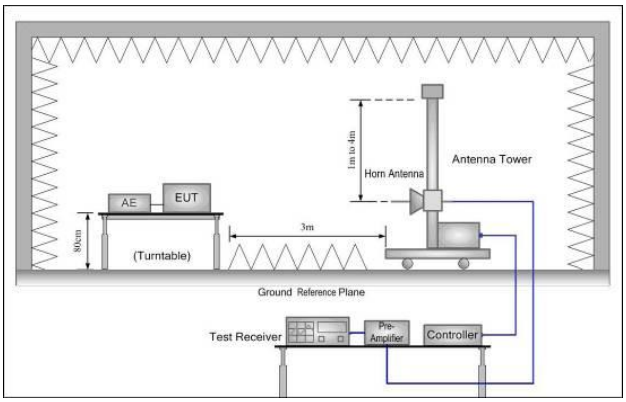
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-230MHz	40.00	Quasi-peak Value
230MHz-1GHz	47.00	Quasi-peak Value
1GHz-3GHz	50.00	Average Value
	70.00	Peak Value
3GHz-6GHz	54.00	Average Value
	74.00	Peak Value

Test setup:

Below 1GHz



Above 1GHz



Test Procedure:	■ **From 30MHz to 1GHz:** 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. ■ **Above 1GHz:** 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Test environment:	Temp.: 25 °C | Humid.: 50% | Press.: 1 010mbar
Measurement Record:	Uncertainty: ± 4.5dB
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

Measurement Data
Below 1GHz
GSM mode

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
32.29	58.75	11.25	0.58	35.17	35.41	40.00	-4.59	Vertical
39.02	52.27	12.04	0.65	35.61	29.35	40.00	-10.65	Vertical
96.10	50.90	11.65	1.16	36.69	27.02	40.00	-12.98	Vertical
239.99	52.74	11.85	2.07	37.37	29.29	47.00	-17.71	Vertical
432.55	46.11	15.99	3.01	37.52	27.59	47.00	-19.41	Vertical
533.83	45.30	18.07	3.46	37.52	29.31	47.00	-17.69	Vertical
32.75	52.01	11.26	0.58	35.20	28.65	40.00	-11.35	Horizontal
96.10	56.02	11.65	1.16	36.69	32.14	40.00	-7.86	Horizontal
204.24	52.72	10.58	1.86	37.33	27.83	40.00	-12.17	Horizontal
239.99	56.47	11.85	2.07	37.37	33.02	47.00	-13.98	Horizontal
252.06	52.94	12.22	2.14	37.38	29.92	47.00	-17.08	Horizontal
432.55	50.07	15.99	3.01	37.52	31.55	47.00	-15.45	Horizontal

GPS mode

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
32.749	59.11	11.26	0.58	35.2	35.75	40	-4.25	Vertical
37.945	53.43	11.86	0.64	35.54	30.39	40	-9.61	Vertical
95.762	51.7	11.59	1.16	36.69	27.76	40	-12.24	Vertical
252.063	49.49	12.22	2.14	37.38	26.47	47	-20.53	Vertical
480.528	44.84	16.93	3.22	37.51	27.48	47	-19.52	Vertical
588.905	44.1	19.23	3.68	37.54	29.47	47	-17.53	Vertical
33.211	54.29	11.27	0.59	35.23	30.92	40	-9.08	Horizontal
95.762	57.25	11.59	1.16	36.69	33.31	40	-6.69	Horizontal
180.017	53.55	8.9	1.74	37.24	26.95	40	-13.05	Horizontal
263.819	53.14	12.58	2.19	37.39	30.52	47	-16.48	Horizontal
300.367	50.15	13.6	2.36	37.42	28.69	47	-18.31	Horizontal
336.035	50.2	14.29	2.55	37.46	29.58	47	-17.42	Horizontal

Above 1GHz

Peak measurement

GSM mode

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1155.00	37.22	25.03	4.43	35.87	30.81	74.00	-43.19	Vertical
1715.00	36.62	25.00	4.81	36.32	30.11	74.00	-43.89	Vertical
2440.00	33.98	27.48	5.43	36.89	30.00	74.00	-44.00	Vertical
3415.00	35.73	28.67	6.80	37.35	33.85	74.00	-40.15	Vertical
4385.00	34.92	31.05	8.23	37.56	36.64	74.00	-37.36	Vertical
5255.00	34.29	31.79	9.15	37.42	37.81	74.00	-36.19	Vertical
1170.00	37.14	25.17	4.44	35.88	30.87	74.00	-43.13	Horizontal
1730.00	36.09	25.04	4.82	36.33	29.62	74.00	-44.38	Horizontal
2480.00	33.78	27.52	5.47	36.92	29.85	74.00	-44.15	Horizontal
3435.00	35.60	28.76	6.84	37.35	33.85	74.00	-40.15	Horizontal
4405.00	33.69	31.09	8.25	37.57	35.46	74.00	-38.54	Horizontal
5285.00	33.88	31.72	9.19	37.38	37.41	74.00	-36.59	Horizontal

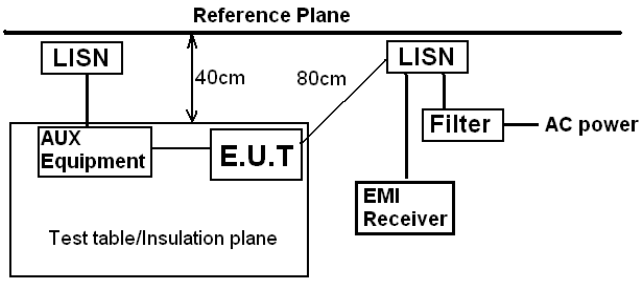
GPS mode

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarity
1095	34.1	24.75	4.38	35.8	27.43	70	-42.57	Vertical
2270	31.51	28	5.26	36.75	28.02	70	-41.98	Vertical
3290	31.54	28.38	6.54	37.33	29.13	74	-44.87	Vertical
4350	27.65	30.93	8.21	37.55	29.24	74	-44.76	Vertical
5290	25.09	31.72	9.19	37.38	28.62	74	-45.38	Vertical
5765	27.15	32.59	9.88	36.71	32.91	74	-41.09	Vertical
1220	33.15	25.43	4.48	35.93	27.13	70	-42.87	Horizontal
2205	32.21	27.96	5.19	36.69	28.67	70	-41.33	Horizontal
3320	32.09	28.39	6.6	37.33	29.75	74	-44.25	Horizontal
4320	25.27	30.77	8.17	37.54	26.67	74	-47.33	Horizontal
5200	25.48	31.97	9.06	37.51	29	74	-45	Horizontal
5705	23.93	32.5	9.79	36.8	29.42	74	-44.58	Horizontal

Remark:

1. The EUT was test at 3m in field chamber.
2. If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

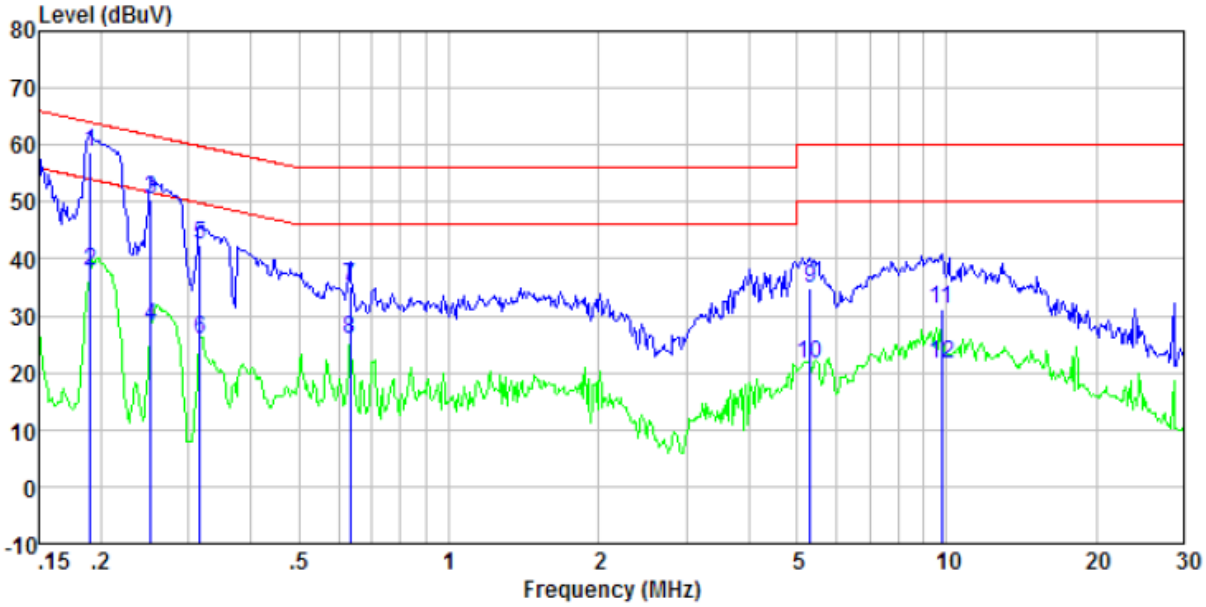
7.1.2 Conducted Emissions

Test Requirement:	ETSI EN 301 489-19/-52
Test Method:	ETSI EN 301 489-1
Test Frequency Range:	150kHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9kHz, VBW=30kHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55032 Class B on conducted measurement.
Test Instruments:	Temp.: 24 °C | Humid.: 51% | Press.: 1 010mbar
Measurement Record:	Uncertainty: ± 3.45dB
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

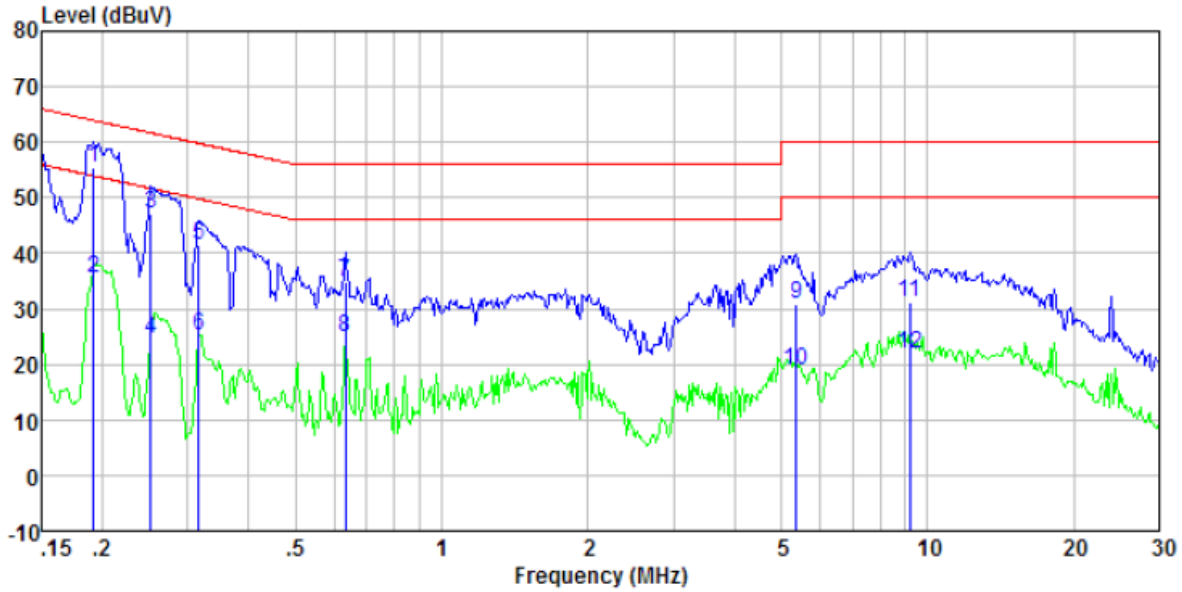
GSM mode

Line:



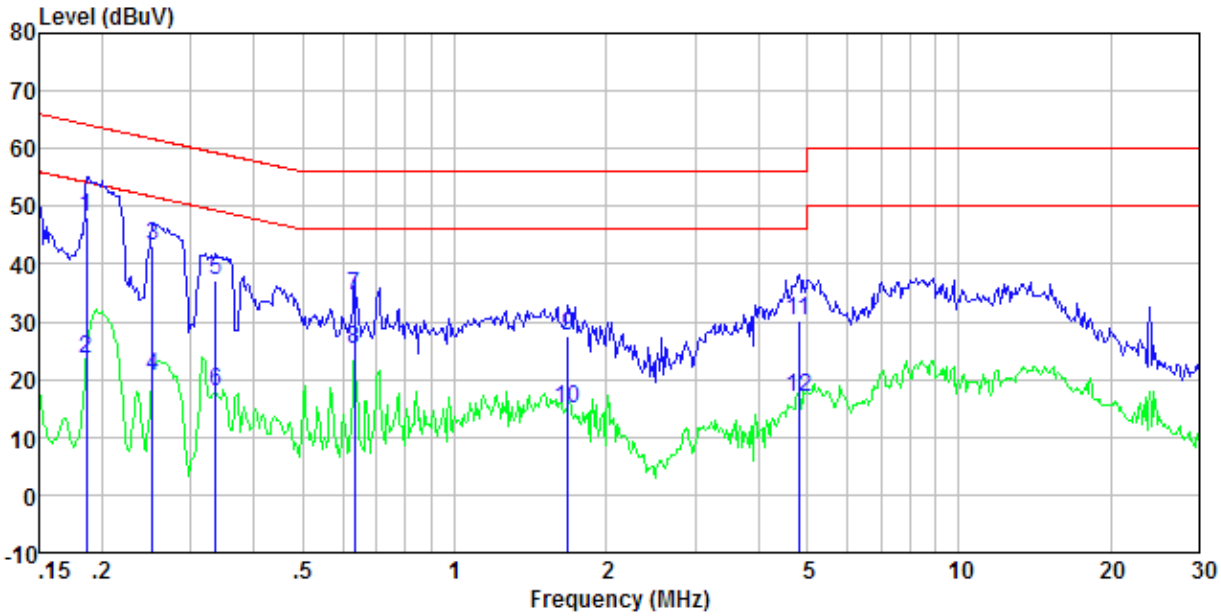
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.19	58.29	0.40	0.10	58.79	64.02	-5.23	QP
0.19	37.38	0.40	0.10	37.88	54.02	-16.14	Average
0.25	49.84	0.40	0.10	50.34	61.69	-11.35	QP
0.25	27.75	0.40	0.10	28.25	51.69	-23.44	Average
0.32	41.91	0.39	0.10	42.40	59.80	-17.40	QP
0.32	25.40	0.39	0.10	25.89	49.80	-23.91	Average
0.63	34.68	0.28	0.12	35.08	56.00	-20.92	QP
0.63	25.60	0.28	0.12	26.00	46.00	-20.00	Average
5.33	34.61	0.20	0.17	34.98	60.00	-25.02	QP
5.33	21.22	0.20	0.17	21.59	50.00	-28.41	Average
9.76	30.85	0.20	0.20	31.25	60.00	-28.75	QP
9.76	21.11	0.20	0.20	21.51	50.00	-28.49	Average

Neutral:



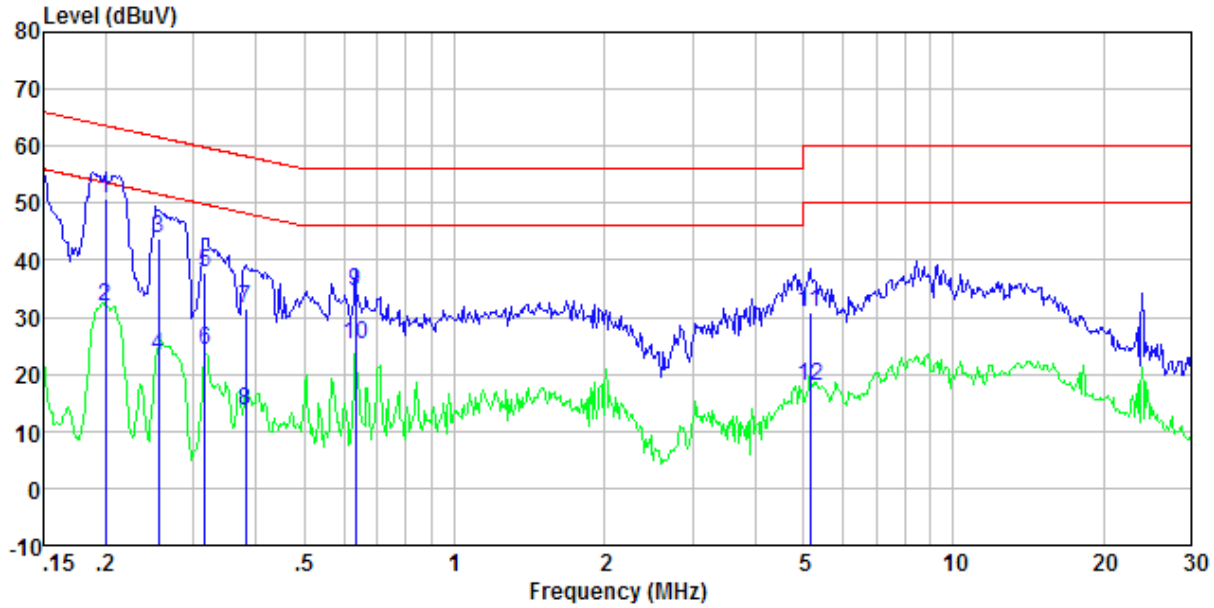
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.19	54.96	0.40	0.11	55.47	63.93	-8.46	QP
0.19	35.13	0.40	0.11	35.64	53.93	-18.29	Average
0.25	46.69	0.40	0.10	47.19	61.69	-14.50	QP
0.25	24.04	0.40	0.10	24.54	51.69	-27.15	Average
0.32	40.92	0.39	0.10	41.41	59.80	-18.39	QP
0.32	24.83	0.39	0.10	25.32	49.80	-24.48	Average
0.63	34.28	0.28	0.12	34.68	56.00	-21.32	QP
0.63	24.59	0.28	0.12	24.99	46.00	-21.01	Average
5.36	30.54	0.20	0.17	30.91	60.00	-29.09	QP
5.36	18.63	0.20	0.17	19.00	50.00	-31.00	Average
9.20	30.87	0.20	0.20	31.27	60.00	-28.73	QP
9.20	21.37	0.20	0.20	21.77	50.00	-28.23	Average

GPS
Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.19	47.46	0.40	0.10	47.96	64.20	-16.24	QP
0.19	23.15	0.40	0.10	23.65	54.20	-30.55	Average
0.25	42.55	0.40	0.10	43.05	61.69	-18.64	QP
0.25	20.06	0.40	0.10	20.56	51.69	-31.13	Average
0.34	36.71	0.38	0.10	37.19	59.31	-22.12	QP
0.34	17.50	0.38	0.10	17.98	49.31	-31.33	Average
0.63	33.95	0.28	0.12	34.35	56.00	-21.65	QP
0.63	24.89	0.28	0.12	25.29	46.00	-20.71	Average
1.68	27.28	0.20	0.17	27.65	56.00	-28.35	QP
1.68	14.70	0.20	0.17	15.07	46.00	-30.93	Average
4.82	29.97	0.20	0.17	30.34	56.00	-25.66	QP
4.82	16.45	0.20	0.17	16.82	46.00	-29.18	Average

Neutral:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.20	50.11	0.40	0.11	50.62	63.62	-13.00	QP
0.20	31.32	0.40	0.11	31.83	53.62	-21.79	Average
0.25	43.43	0.40	0.10	43.93	61.60	-17.67	QP
0.25	22.70	0.40	0.10	23.20	51.60	-28.40	Average
0.32	37.49	0.39	0.10	37.98	59.80	-21.82	QP
0.32	23.63	0.39	0.10	24.12	49.80	-25.68	Average
0.38	30.91	0.36	0.10	31.37	58.25	-26.88	QP
0.38	13.28	0.36	0.10	13.74	48.25	-34.51	Average
0.63	34.20	0.28	0.12	34.60	56.00	-21.40	QP
0.63	24.95	0.28	0.12	25.35	46.00	-20.65	Average
5.17	30.49	0.20	0.17	30.86	60.00	-29.14	QP
5.17	17.69	0.20	0.17	18.06	50.00	-31.94	Average

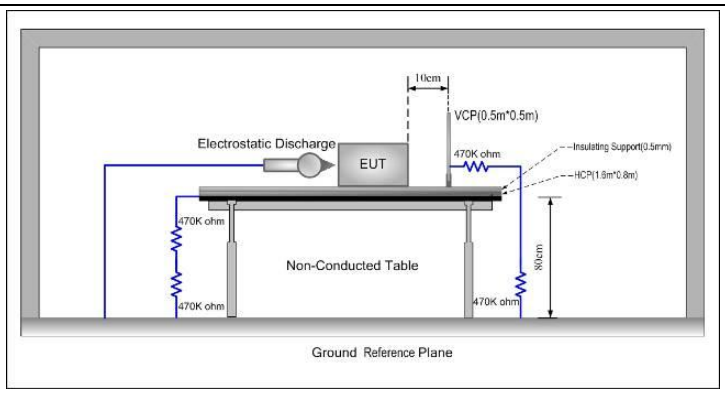
Notes:

1. *An initial pre-scan was performed on the live and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

7.2 Immunity

Performance Criteria of ETSI EN 301 489-19/-52, clause 6	
Continuous phenomena applied to transmitters (CT)	1. 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). 2. 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. 3. 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.
Transient phenomena applied to Transmitters (TT)	1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. 2. 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. 3. 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.
Continuous phenomena applied to Receivers (CR)	1. During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence. 2. 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). 3. 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.
Transient phenomena applied to Receivers (TR)	1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. 2. 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
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.

7.2.1 Electrostatic Discharge

Test Requirement:	ETSI EN 301 489-19/-52
Test Method:	EN 61000-4-2
Discharge Voltage:	Contact Discharge: ±4kV Air Discharge: ±8kV HCP/VCP: ±4kV
Polarity:	Positive & Negative
Number of Discharge:	Contact Discharge: Minimum 10 times at each test point, Air Discharge: Minimum 10 times at each test point.
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Limit:	Criteria B
Test setup:	
Test Procedure:	**Air discharge:** 1. The test was applied on non-conductive surfaces of EUT. 2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. 3. After each discharge, the discharge electrode was removed from the EUT. 4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 5. This procedure was repeated until all the air discharge completed **Contact Discharge:** 1. The test was applied on conductive surfaces of EUT. 2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. 3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated. **Indirect discharge for horizontal coupling plane** 1. At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT. 2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge. 3. Consideration should be given to exposing all sides of the EUT.

	Indirect discharge for vertical coupling plane 1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane. 2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. 3. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.					
Test environment:	Temp.:	24 °C	Humid.:	51%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test results:	Pass					

Measurement Record:

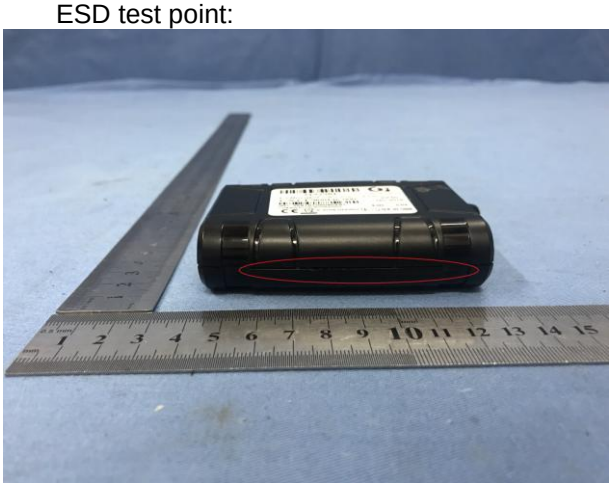
Test points:	I: N/A II: please refer to red ring points.			
Direct discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observations Performance**	**Result**
± 4	Contact	I	N/A	N/A
±2 ,± 4, ±8	Air	II	A	Pass
Indirect discharge				
Discharge Voltage (KV)	**Type of discharge**	**Test points**	**Observation Performance**	**Result**
± 4	HCP-Bottom/Top/ Front/Back/Left/Right	Edge of the HCP	A	Pass
± 4	VCP-Front/Back /Left/Right	Center of the VCP	A	Pass

Remarks:

A: Normal performance within the specification limits.

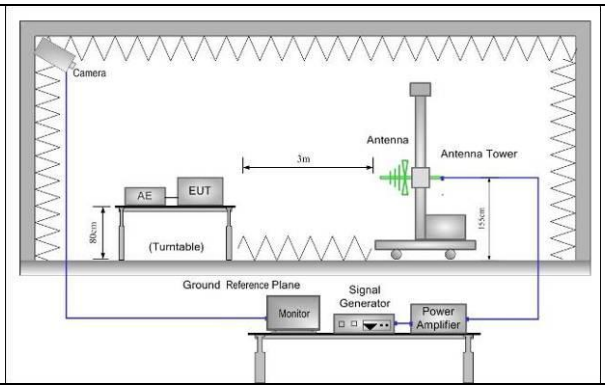
B: During the test, it may loss some functions, after test it can work in normal condition.

ESD test point:



Remark:
Red Cross: Direct contact discharge test points.

7.2.2 Radio frequency electromagnetic field

Test Requirement:	ETSI EN 301 489-19/-52
Test Method:	EN 61000-4-3
Frequency range:	80MHz to 6GHz
Test Level:	3V/m
Modulation:	80%, 1kHz Amplitude Modulation
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items. 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length. 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area). 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary.Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value. 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s. 6. The test normally was performed with the generating antenna facing each side of the EUT. 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.

Test monitor:	**Traffic mode:** 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
	Idle mode: 1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. 2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 010mbar
Test Instruments:	Refer to section 6.0 for details					
Test results:	Pass					

Measurement Record:

GSM Mode

■ **Idle mode:**

Test monitor: BCCH and CCCH

Measurement result:

Note: During the test, the uplink/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). The RXQUAL of the downlink is not exceeding the value of three, measured during each individual exposure in the test sequence. Or During and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level.

Frequency	Level	Modulation	Operating Mode	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment	Traffic mode	V	Front	A
				H		A
				V	Rear	A
				H		A
				V	Left	A
				H		A
				V	Right	A
				H		A
				V	Top	A
				H		A
				V	Bottom	A
				H		A

Remarks:

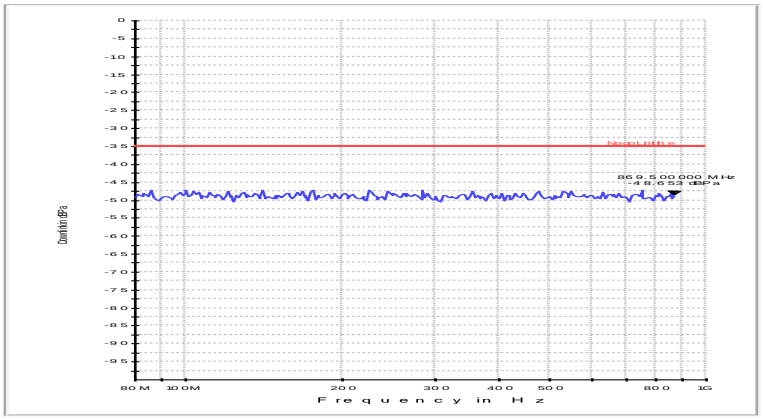
A: normal performance within the specification limits

■ **Traffic mode:**

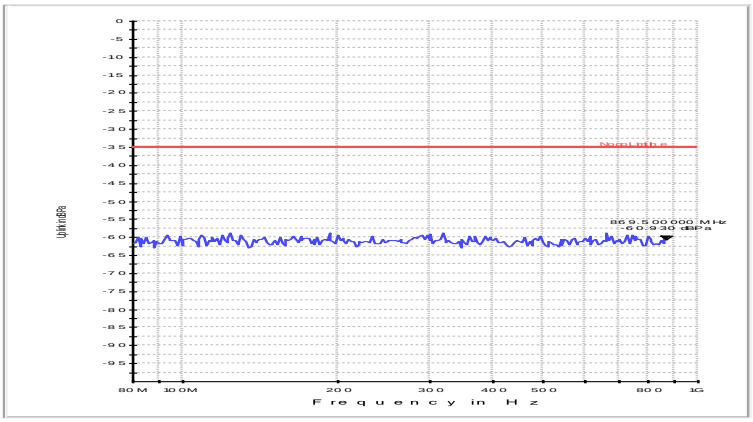
■ *Remark: Only the worst face's(top) plots is show.*

Test mode:	Traffic mode(GSM900)	Frequency range:	80MHz~1GHz	Polarity:	Horizontal

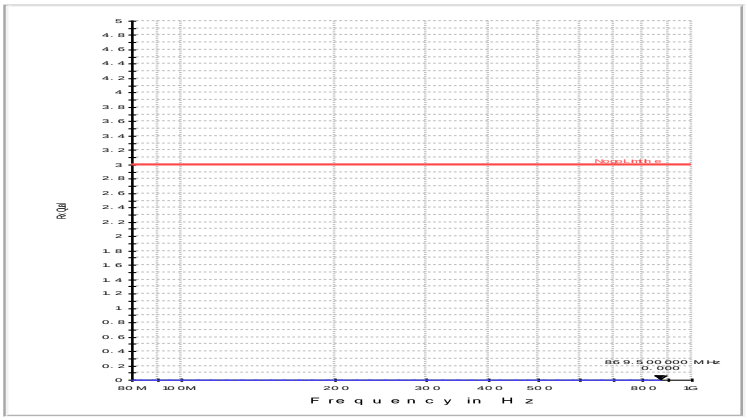
Down Link:



Up Link:

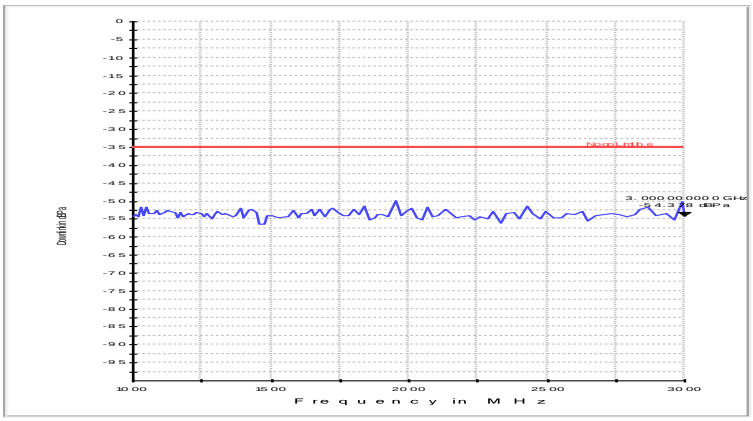


RX Quality:



Test mode:	Traffic mode(GSM900)	Frequency range:	1GHz~3GHz	Polarity:	Horizontal

Down Link:



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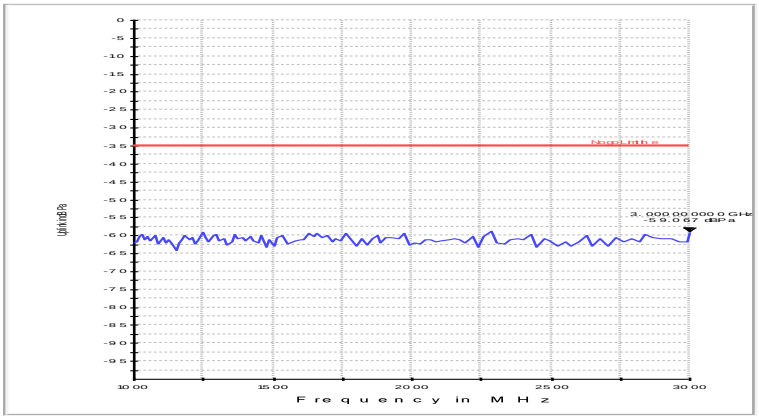

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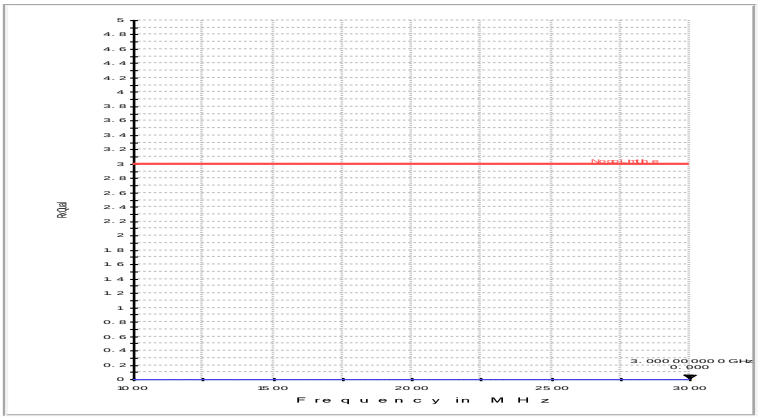
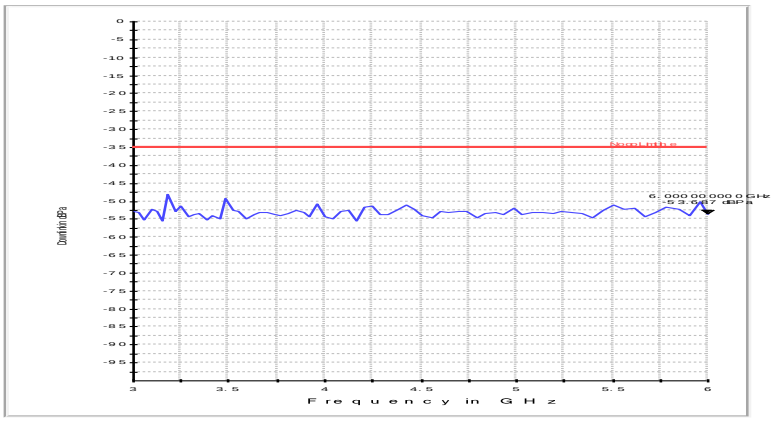


Test mode:	Traffic mode(GSM900)	Frequency range:	3GHz~6GHz	Polarity:	Horizontal

Down Link:



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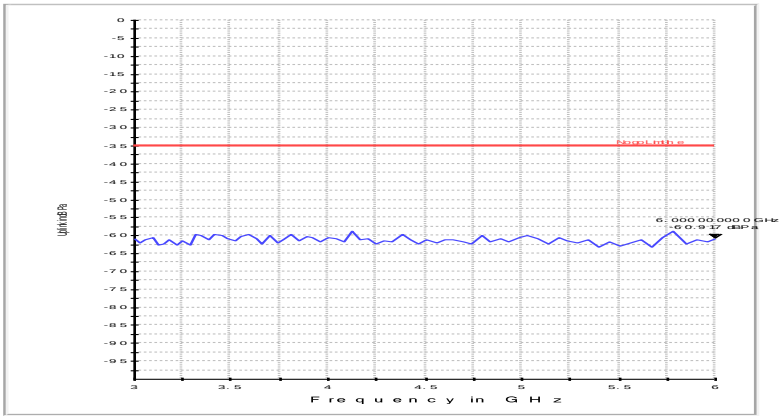

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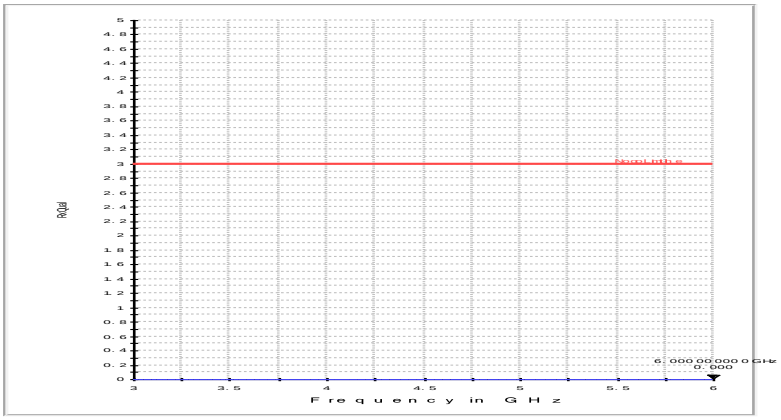
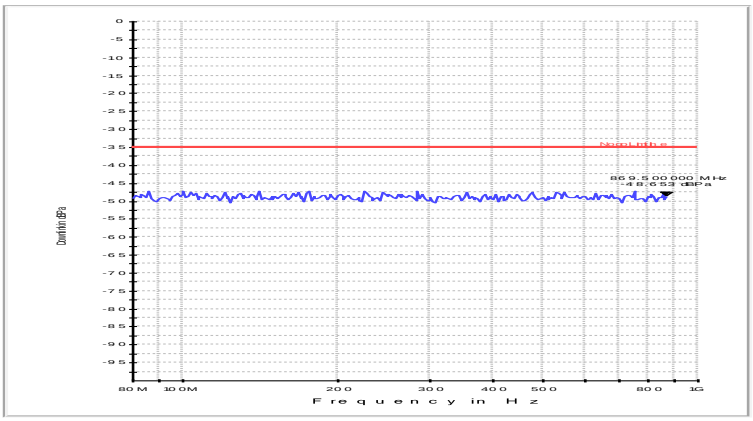


Test mode:	Traffic mode(GSM900)	Frequency range:	80MHz~1GHz	Polarity:	Vertical

Down Link:



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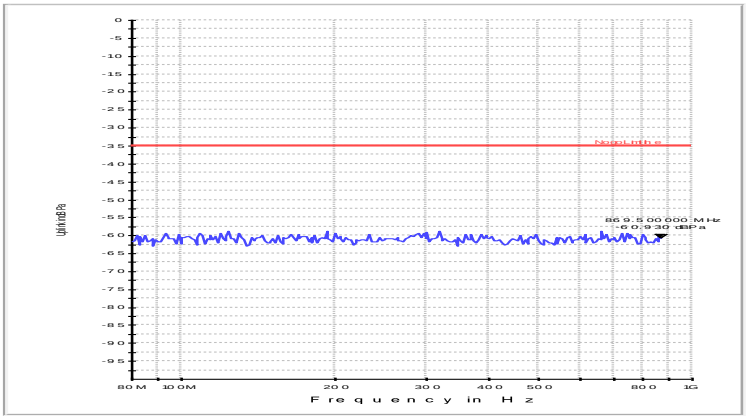

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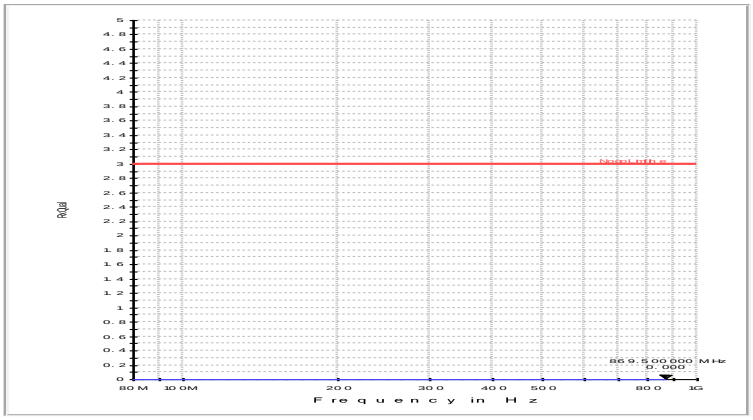
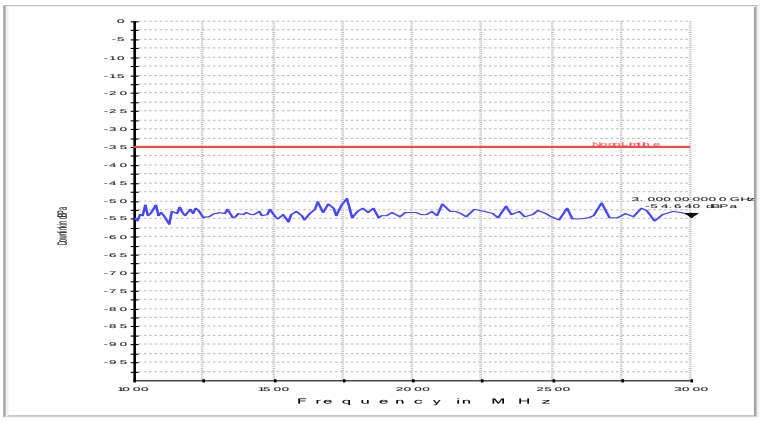


Test mode:	Traffic mode(GSM900)	Frequency range:	1GHz~3GHz	Polarity:	Vertical

Down Link:



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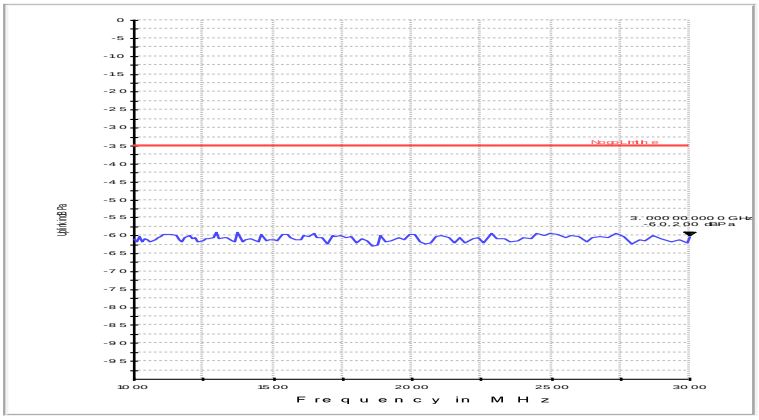
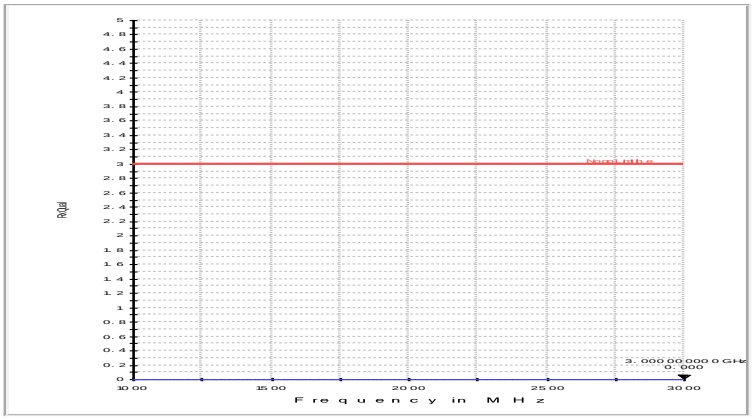
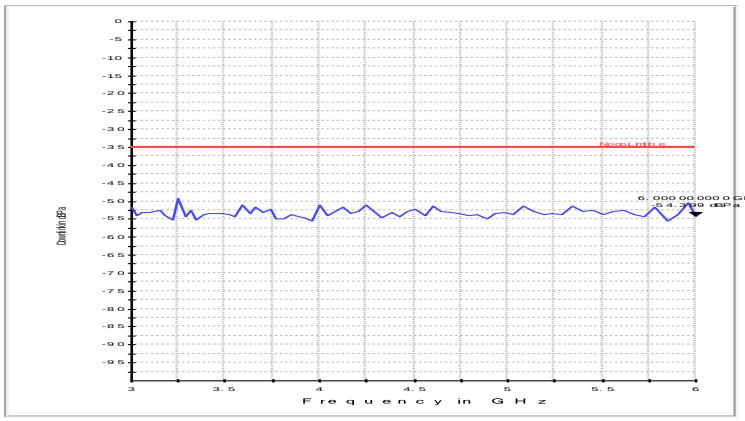


RX Quality:



Test mode:	Traffic mode(GSM900)	Frequency range:	3GHz~6GHz	Polarity:	Vertical

Down Link:



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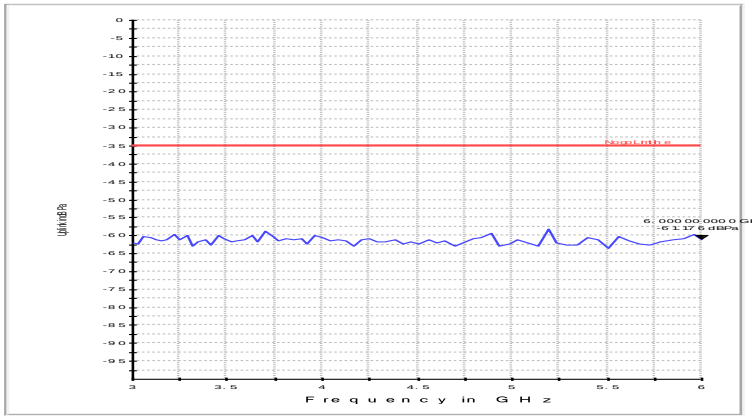

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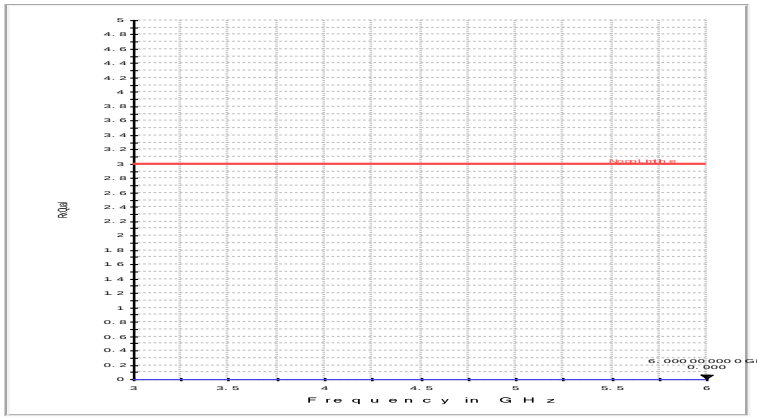
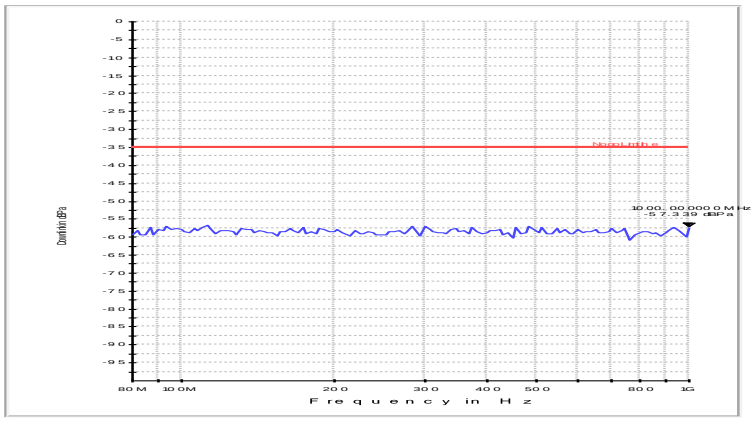


Test mode:	Traffic mode(DCS 1800)	Frequency range:	80MHz~1GHz	Polarity:	Horizontal

Down Link:



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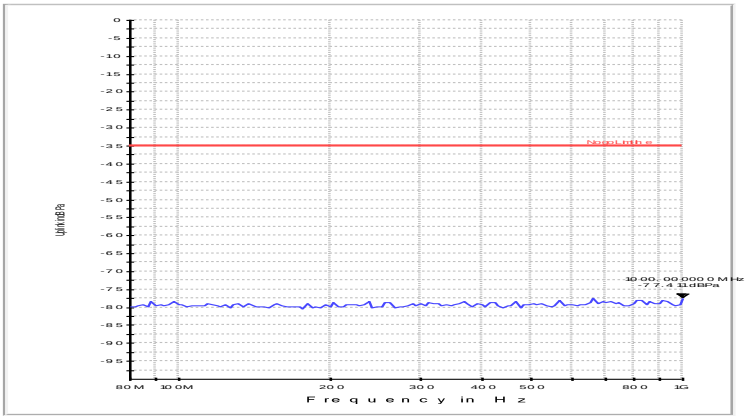
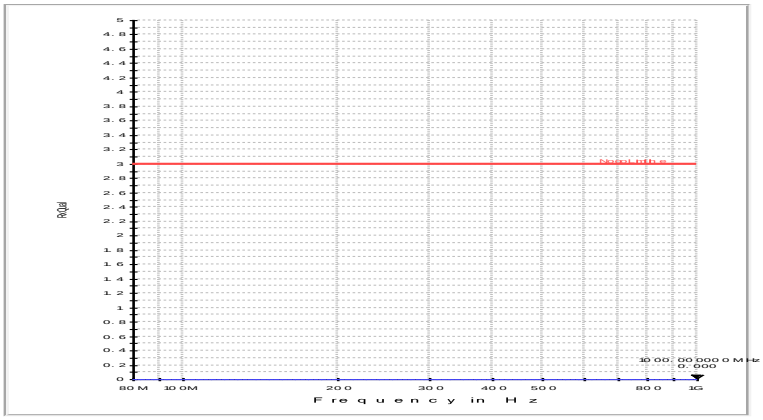
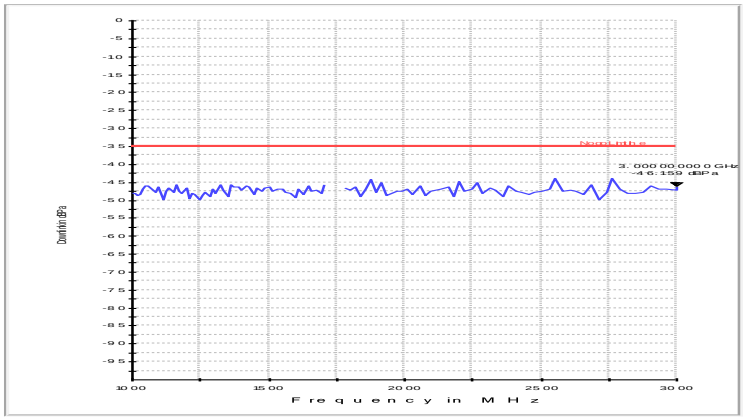


RX Quality:

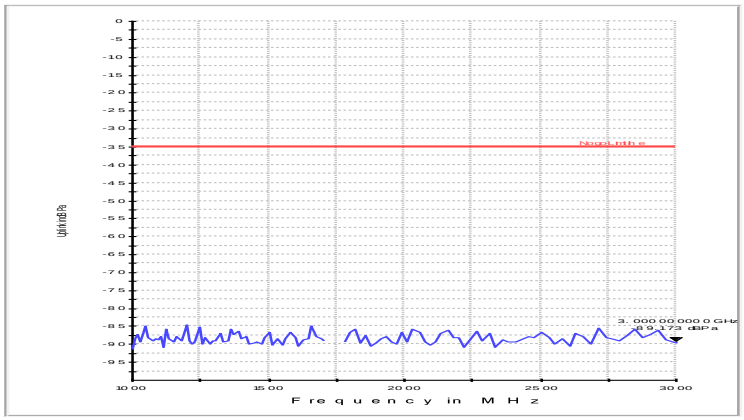


Test mode:	Traffic mode(DCS 1800)	Frequency range:	1GHz~3GHz	Polarity:	Horizontal

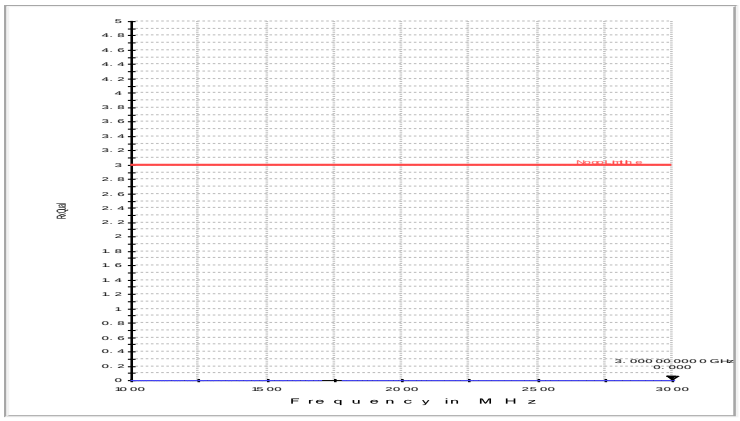
Down Link:



Up Link:

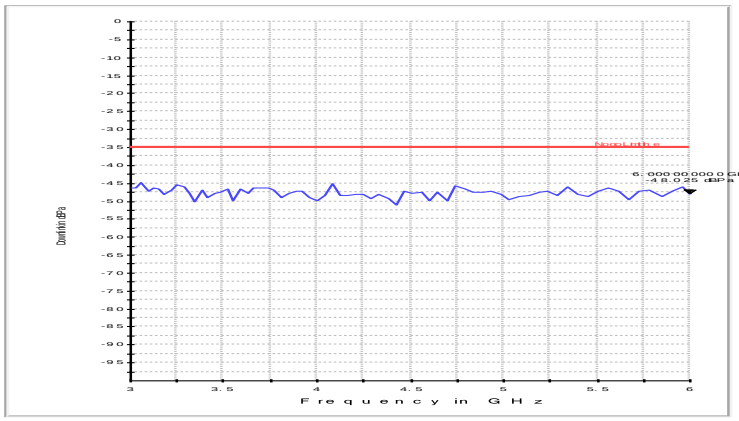


RX Quality:

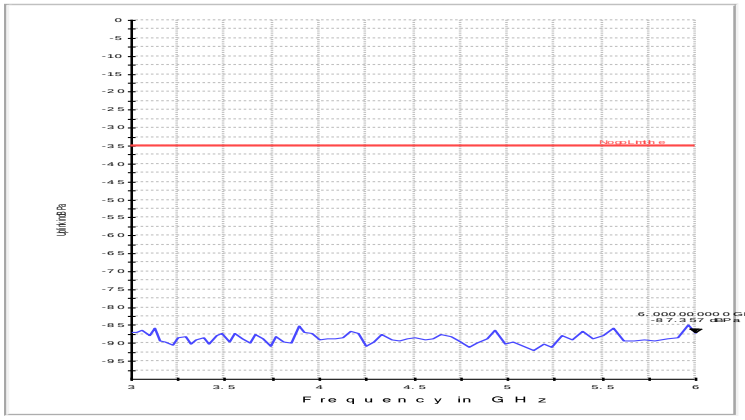


Test mode:	Traffic mode(DCS 1800)	Frequency range:	3GHz~6GHz	Polarity:	Horizontal

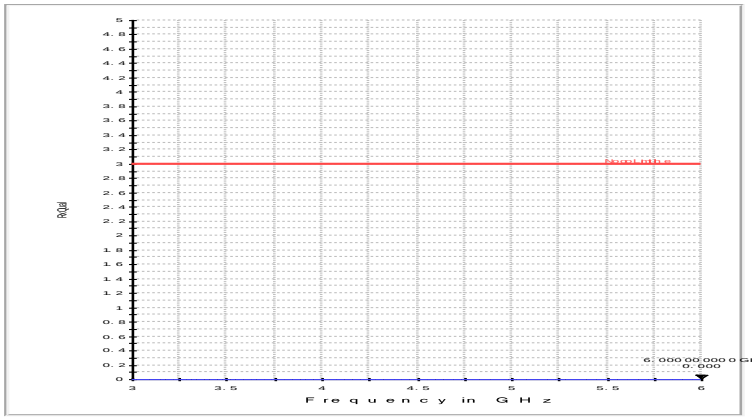
Down Link:



Up Link:

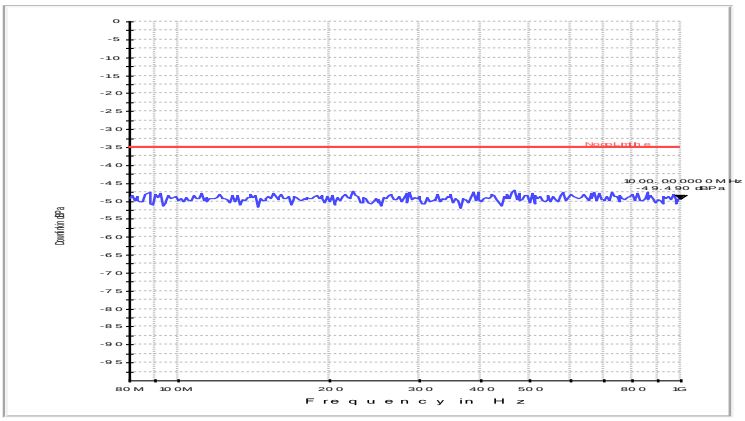


RX Quality:



Test mode:	Traffic mode(DCS 1800)	Frequency range:	80MHz~1GHz	Polarity:	Vertical

Down Link:



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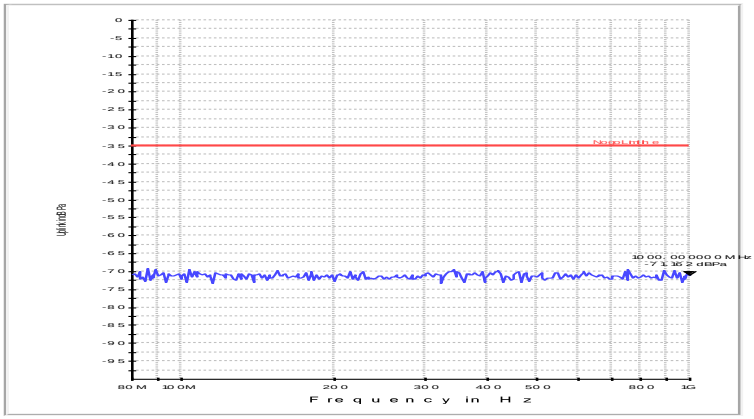
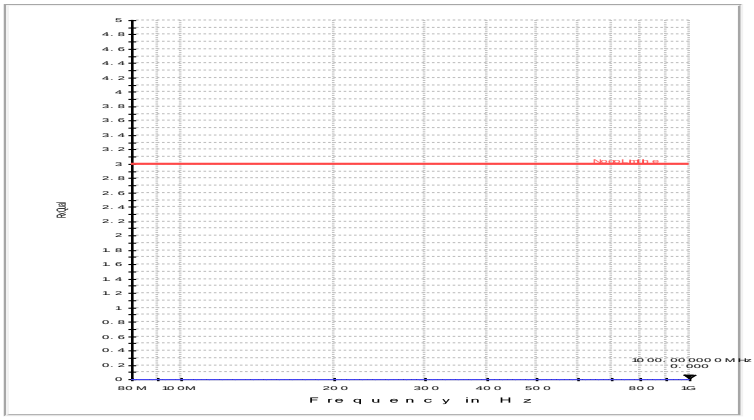
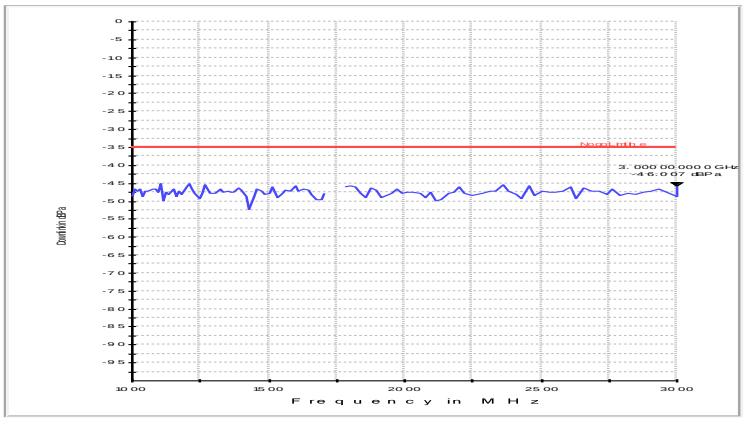


RX Quality:

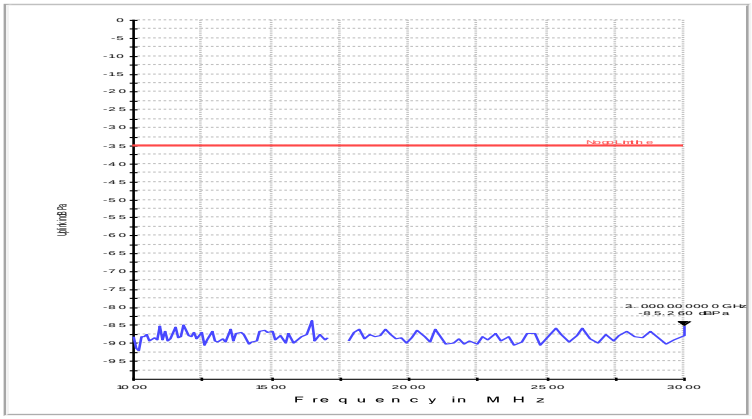


Test mode:	Traffic mode(DCS 1800)	Frequency range:	1GHz~3GHz	Polarity:	Vertical

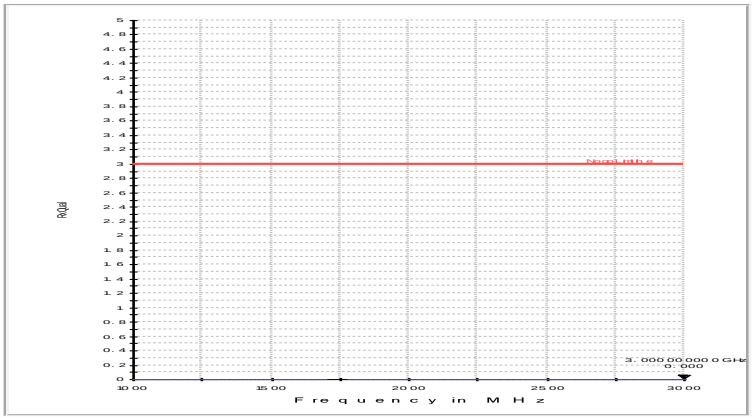
Down Link:



Up Link:

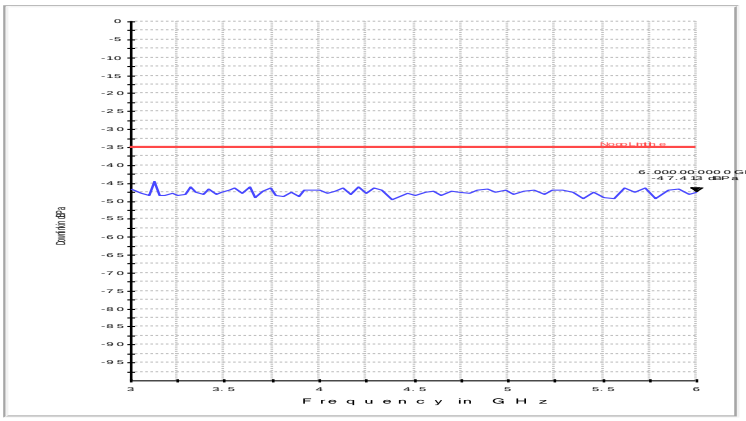


RX Quality:



Test mode:	Traffic mode(DCS 1800)	Frequency range:	3GHz~6GHz	Polarity:	Vertical

Down Link:



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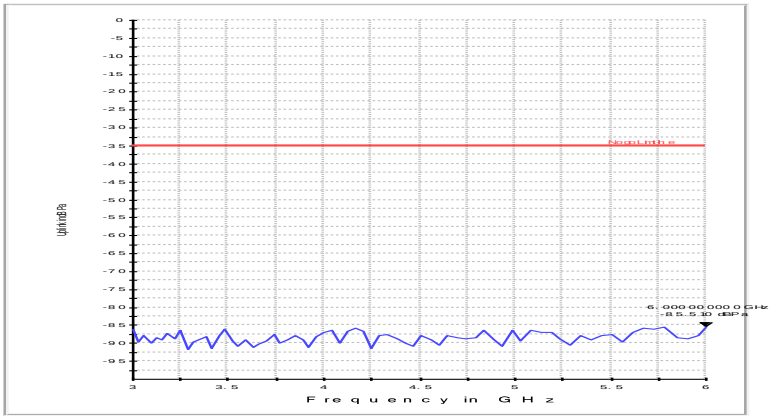
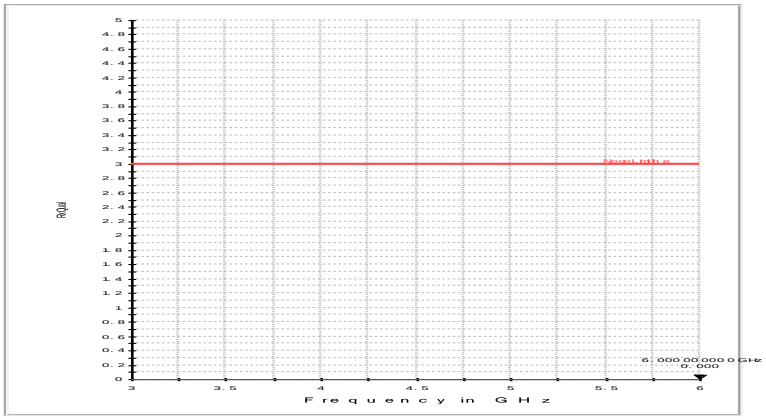


RX Quality:



GPS Mode:

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)
80 MHz-6 GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment,	V	Front	A
			H		A
			V	Rear	A
			H		A
			V	Left	A
			H		A
			V	Right	A
			H		A
			V	Top	A
			H		A
			V	Bottom	A
			H		A

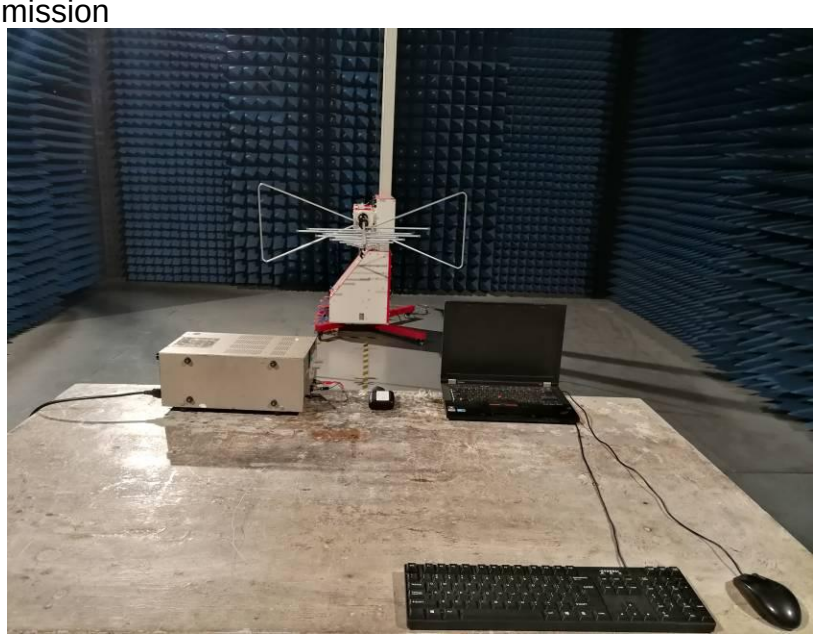
Remarks:

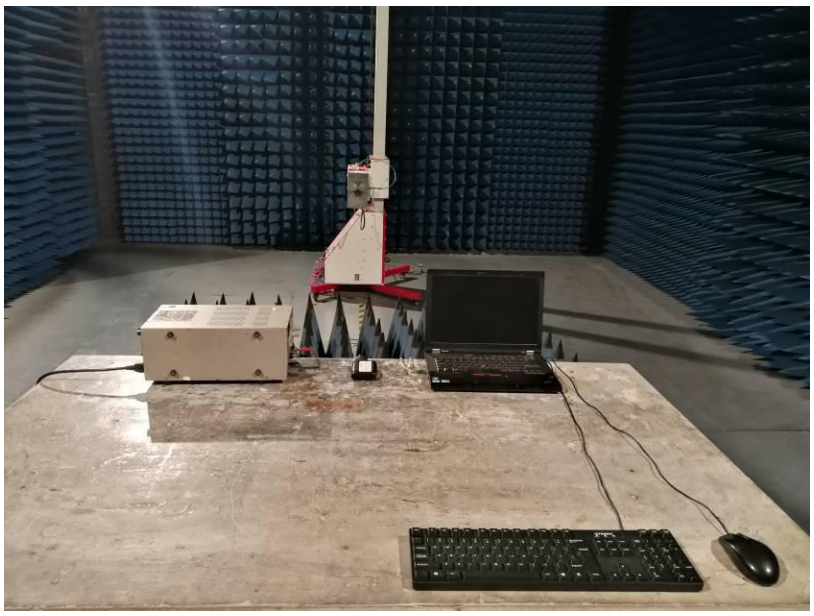
A: Normal performance within the specification limits.

B:For GPS test, additional spot frequency has been performed at 80MHz, 104MHz, 136MHz, 165MHz, 200MHz, 260MHz, 330MHz, 430MHz, 560MHz, 715MHz ± 1MHz and at 920MHz ± 1MHz using a test level of 3V/m (measured unmodulated) 100% modulated by 200Hz pulses of equal mark to space ratio.

8 Test Setup Photo

Radiated Emission

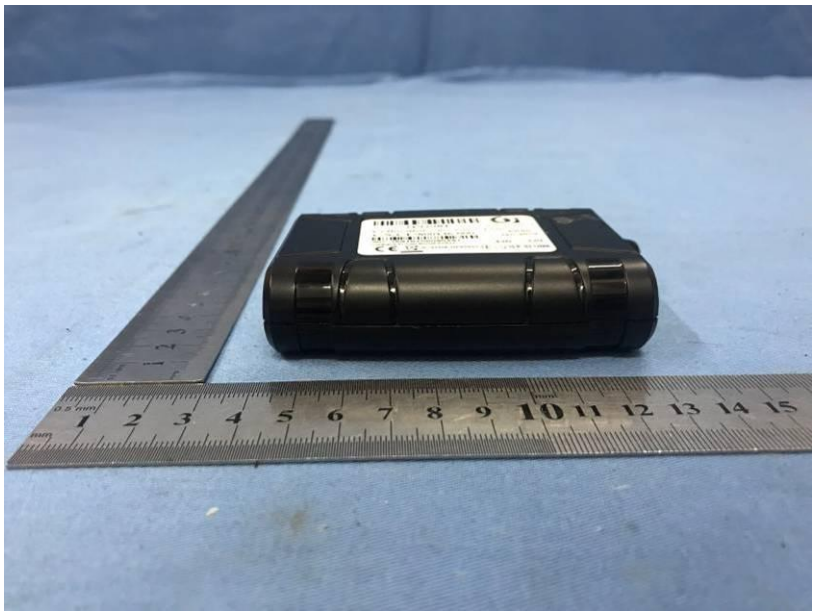


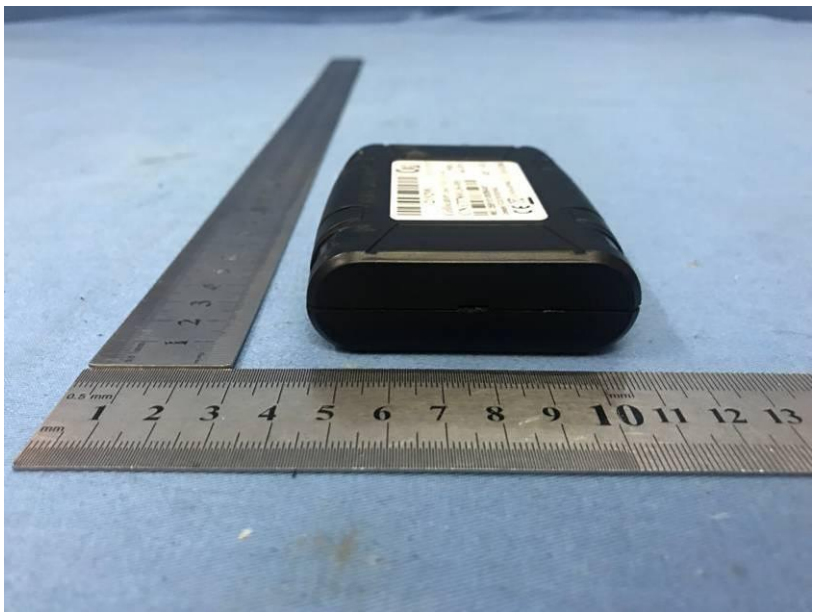


Conducted Emission

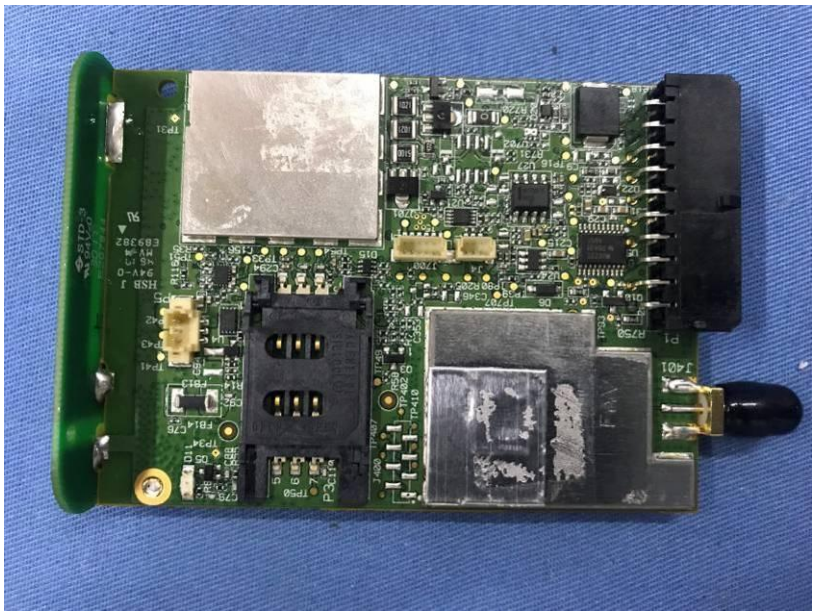
ESD

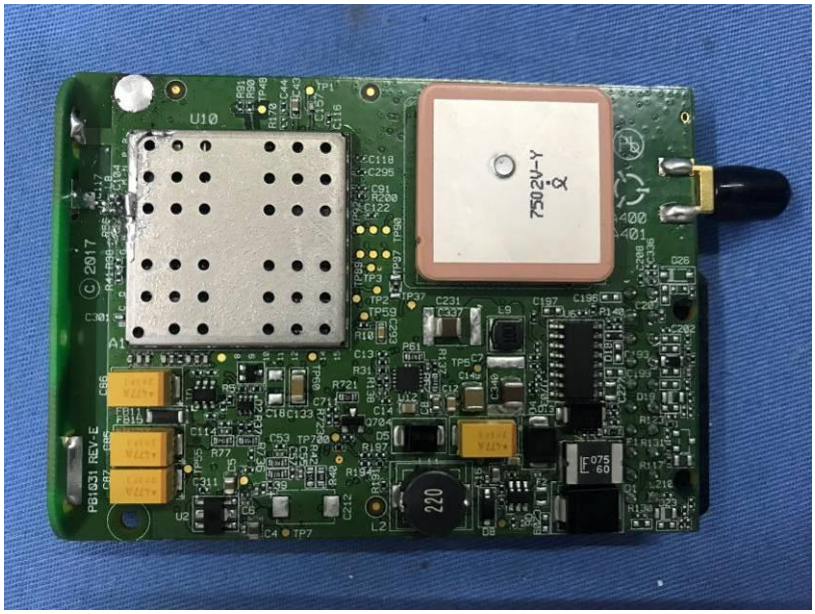
9 EUT Constructional Details

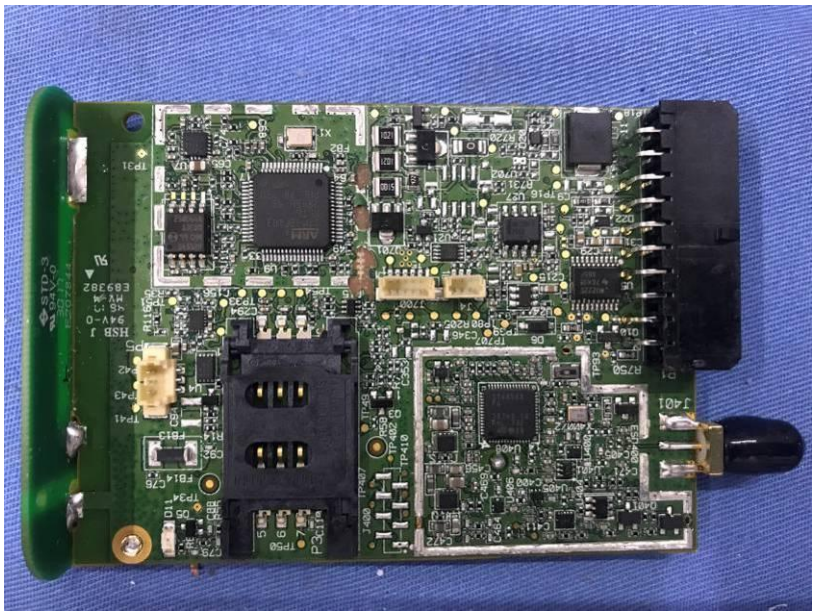


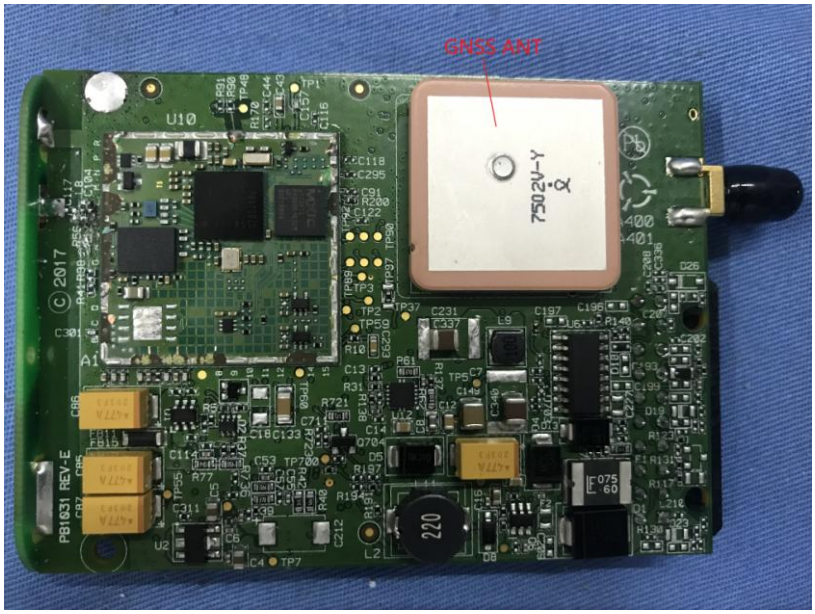



711-20062
Lithium Ion Polymer Battery Pack
1000mAh 3.7Volt 3.7Wh 603450
Date of man't: 2117
Do not use if damaged.
Do not disassemble.
Do not expose to high temperatures.
Do not incinerate.
Do not short circuit.
Dispose of properly.





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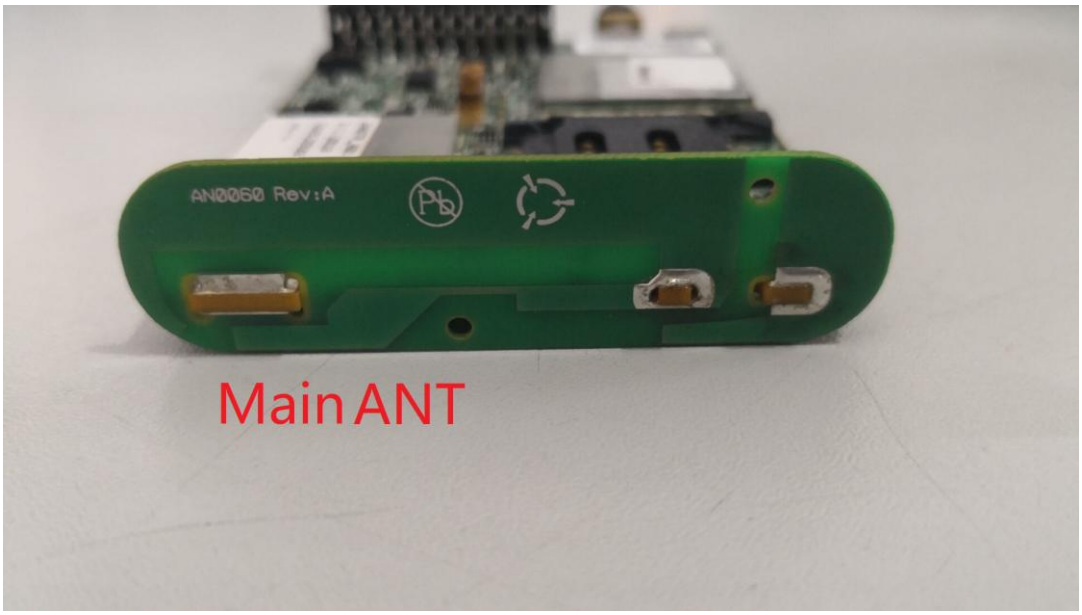

------End------