47 CFR Part 15 Subpart B

Electromagnetic Compatibility Test Report

For

von-U61

ORDER NO.: 200610K007

REPORT NO.: FC200610K007 R1

ISSUED DATE: 10, September, 2020

MODEL NO.: JTLC-5000

JASTECM CO.,LTD.

C-402, Pangyo-ro 242, Boondang-Gu, Seongnam-Si, Gyeonggi-Do, 13487, Korea

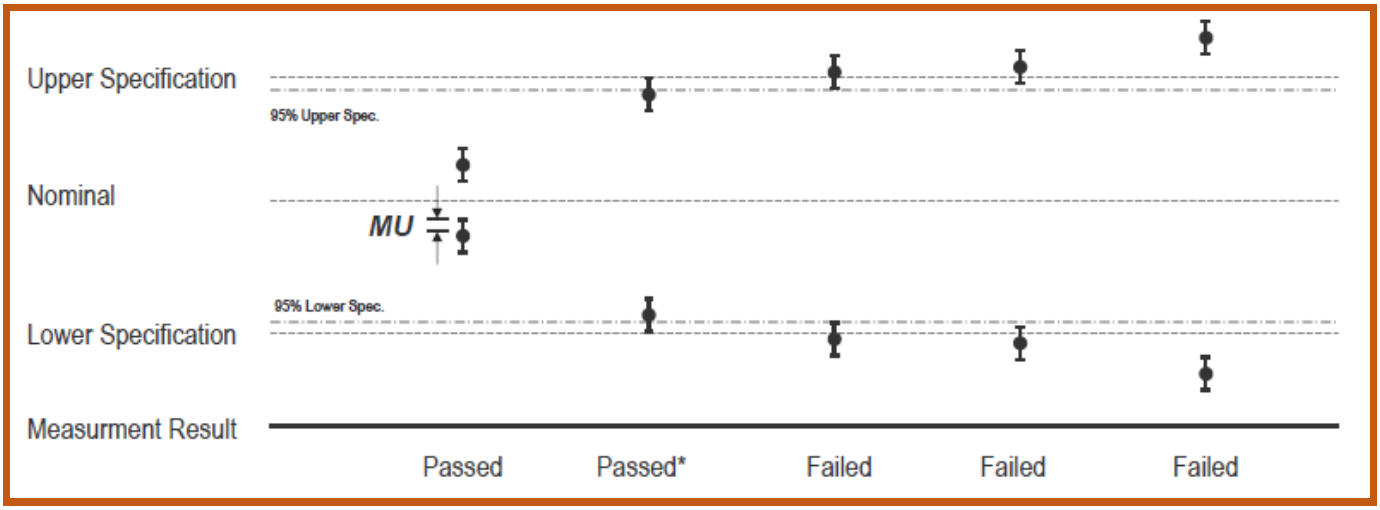
Certificate #4068.03

Test Report Details

Test Report No.	FC200610K007 R1
Tests Performed By:	Bureau Veritas CPS ADT Korea Ltd. Innoplex No.2 106, Sinwon-ro 306, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Republic of Korea
Test site:	Bureau Veritas CPS ADT Korea Ltd. HeungAn-daero 49, DongAn-gu, Anyang-si, Gyeonggi-do, 11419 Republic of Korea
Applicant:	JASTECM CO.,LTD. C-402, Pangyo-ro 242, Boondang-Gu, Seongnam-Si, Gyeonggi-Do, 13487, Republic of Korea
Product Type:	von-U61
Model Number:	JTLC-5000
Product standards:	47 CFR Part 15 Subpart B / ANSI C63.4-2014
FCC Classification	Class B
FCC ID	2ASMR-JTLC-5000
HW Version	v0.31
SW Version	v0.01
Sample Receive Date:	01, September, 2020
Testing Start Date:	04, September, 2020
Date Testing Complete:	06, September, 2020

Overall Results

I. DECISION RULE FOR STATEMENT OF CONFORMITY



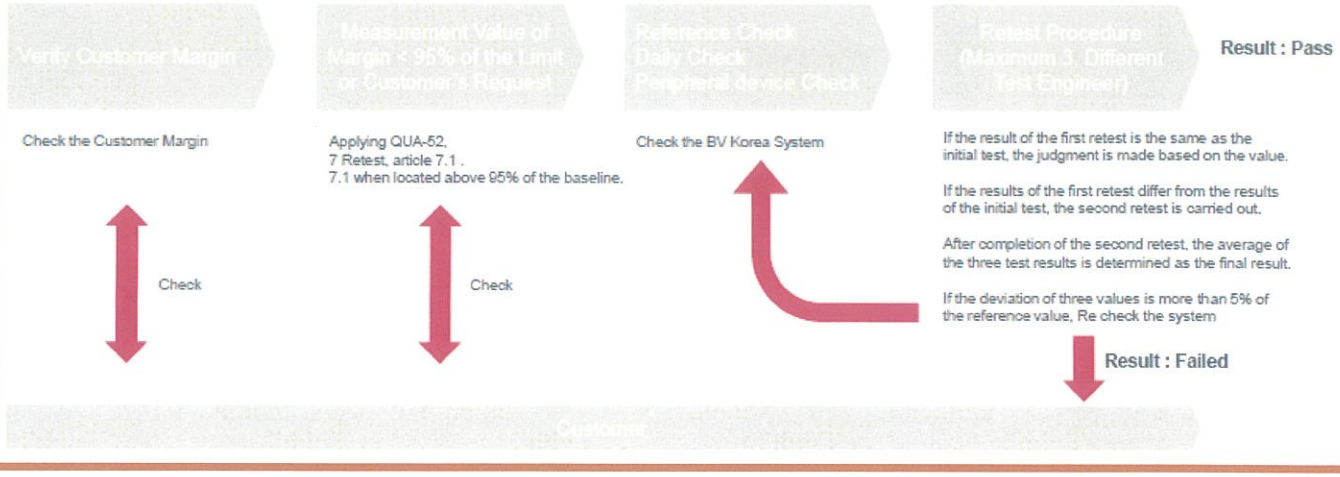
MU =95% expanded measurement uncertainty
QUA-52 Decision Rule Applied
Step 1: Reference Check, Daily Check, Peripheral device Check
Step 2: Retest Procedure (Maximum 3, Different Test Engineer)
1) If the result of the first retest is the same as the initial test, the judgment is made based on the value.
2) If the results of the first retest differ from the initial test result, the second retest is carried out.
After completion of the second retest, the average of the three test results is determined as the final result.
If the deviation of three values is more than 5% of the reference value, Re check the system

II. Measurement uncertainty

Test Item	Measurement uncertainty
Conducted emission	2.62 dB
Radiated emission (1㎓ Below)	4.04 dB
Radiated emission (1㎓ Over)	5.10 dB
Note 1: Measurement uncertainty is calculated in according with CISPR 16-4-2: 2011+A1:2014+A2:2018 The measurement uncertainty is given with a confidence of 95 % with the coverage factor, k=2.	

III. FLOW CHART FOR DECISION RULE

The propose is to establish and apply a decision rule for calculating test result to ensure the validity of the test results and to inform the customer
Reference : ISO/IEC 17025 : 2017, BV CPS Quality Manual, QUA-52 Decision Rule for Statement of Conformity.



IV. FINAL DECISION

RELEASE CONTROL RECORD

REPORT NO.	REASON FOR CHANGE	DATE ISSUED
FC200610K007	Original release	10, September, 2020
FC200610K007 R1	Re-arrangement of photo and added the board photo	14, September, 2020

This project has been tested and verified to comply with the requirements of ***Bureau Veritas CPS ADT Korea Ltd.*** Therefore, this certificate is issued.

PREPARED BY : _____ , **DATE :** 14. September. 2020
Bob Kim / Senior Engineer

APPROVED BY : _____ , **DATE :** 14. September. 2020
Wan Kim / Senior Manger

Table of Contents

1. EMC Result Conclusion (With Justification)

The following tests were performed on a sample submitted for evaluation of compliance with 47 CFR Part 15.109 (b) Class B			
Test requirements	**Standard**	**Results**	**Verdict**
Emissions			
Radiated RF Emissions	ANSI C63.4	Pass	Complied
We tested the von-U61, Model: JTLC-5000, to determine if it was in compliance with the relevant standards as marked on the EMC Verification Summary. We found that the unit met the requirement of 47 CFR Part 15 Subpart B / ANSI C63.4-2014 standards when tested as received. The production units are required to conform to the initial sample as received when the units are placed on the market.			
Note) Applied Regulation § 15.101 (b) Only those receivers that operate (tune) within the frequency range of 30-960 MHz, CB receivers and radar detectors are subject to the authorizations shown in paragraph (a) of this section. Receivers operating above 960 MHz or below 30 MHz, except for radar detectors and CB receivers, are exempt from complying with the technical provisions of this part but are subject to §15.5. The device contains receivers which tune and operating between 30 MHz ~ 960 MHz in the following bands: UMTS Band5, LTE Band5, LTE Band 12, LTE Band 13, LTE Band 14, LTE Band 71			

2. Test Condition

2.1 Ancillary Equipment

Use*	Product Type	Manufacturer	Model	FCC ID
EUT	von-U61	JASTECM CO.,LTD.	JTLC-5000	2ASMR-JTLC-5000
SIM	CAN Simulator	JASTECM CO.,LTD.	ECUsim 2000	-
AE	Notebook	Samsung Electronics Co., LTD.	NT950XBV	DoC
AE	AC/DC Adaptor	Loadus	GQ-3012 (CAN Simulator)	-
AE	Mobile	Samsung Electronics Co., LTD.	SHV-E210S	DoC
* **Note:** EUT – Equipment Under Test, AE – Auxiliary/Associated Equipment, SIM – Simulator (Not Subjected to Test)				

2.2 Input/Output Ports

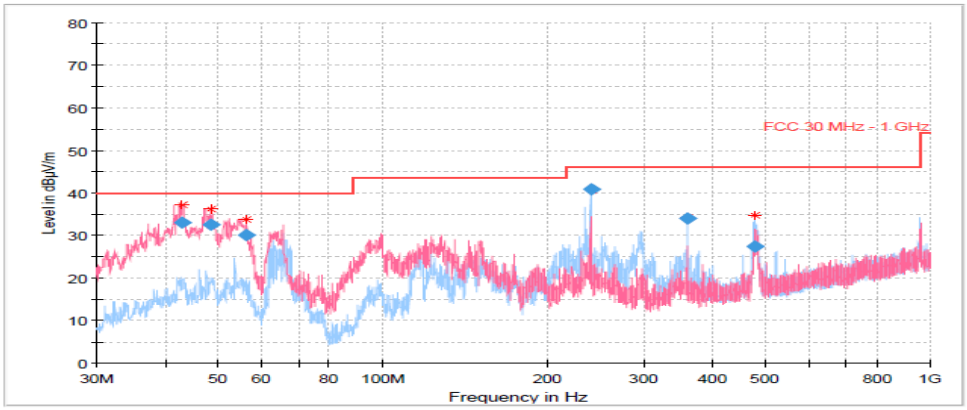
Port #	Name	Type*	Cable (m) Max. >3 m	Cable Shielded	Comments
1	Power	DC	1.2	None-Shielded	-
2	CAN	I/O	1.0	None-Shielded	-
* Note: * AC = AC Power Port, DC = DC Power Port, N/E = Non-Electrical, I/O = Signal Input or Output Port (Not Involved in Process Control), TP = Telecommunication Ports					

2.3 Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Comments
Rated	12 ~ 24	-	-	DC	-
1	12	-	-	DC	Worst Case Note1)
2	24	-	-	DC	-

Note1) EUT was investigated in two case DC 12 V and DC 24 V it was determined that DC 12 V was worst-case. Tested with the worst case DC 12 V.

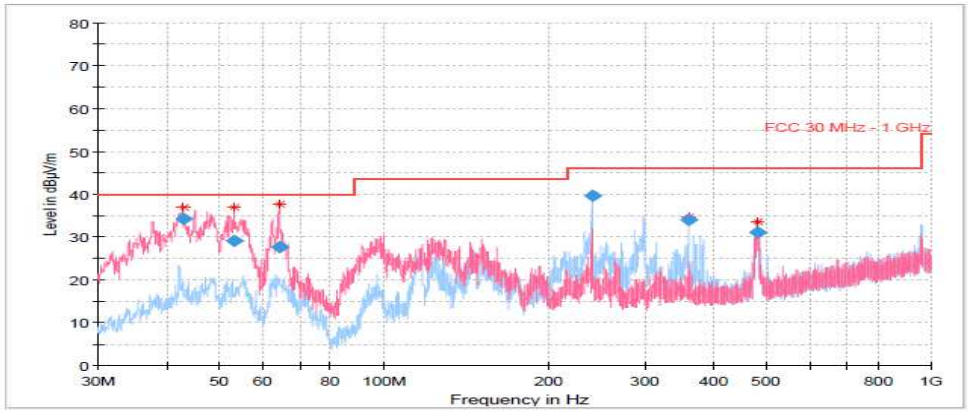
Power Interface Mode 1: DC 12 V – Margin 5.19 dB



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.192000	33.12	40.00	6.88	100.0	V	239.0	-20.0
48.624000	32.51	40.00	7.49	100.0	V	56.0	-19.7
56.384000	30.06	40.00	9.94	100.0	V	355.0	-20.6
240.005000	40.81	46.00	5.19	100.0	H	312.0	-20.7
359.994000	34.04	46.00	11.96	100.0	H	326.0	-18.0
478.237000	27.40	46.00	18.60	100.0	H	0.0	-15.3

Power Interface Mode 2: DC 24 V – Margin 6.32 dB



Final Result

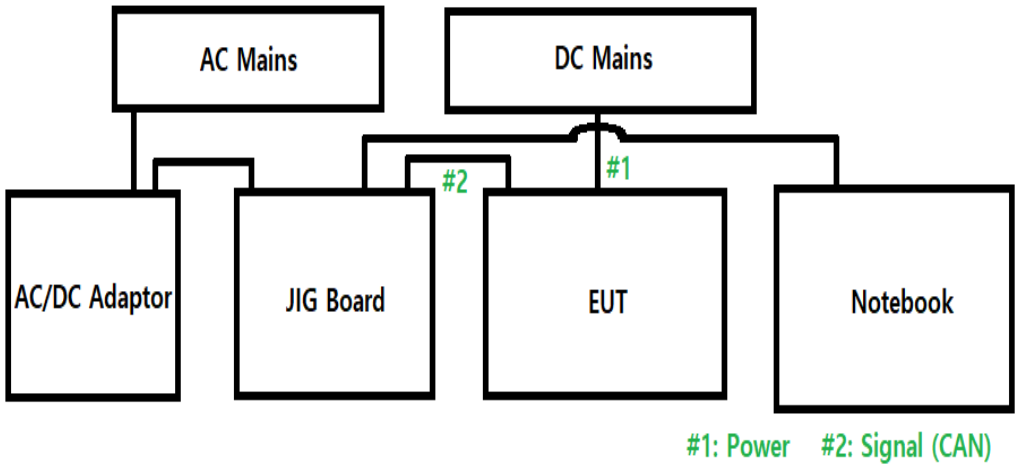
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.998000	34.26	40.00	5.74	100.0	V	252.0	-20.0
53.183000	29.19	40.00	10.81	100.0	V	229.0	-20.1
64.386500	27.66	40.00	12.34	100.0	V	97.0	-22.5
240.005000	39.68	46.00	6.32	100.0	H	308.0	-20.7
359.994000	33.94	46.00	12.06	100.0	H	317.0	-18.0
481.098500	30.97	46.00	15.03	100.0	H	255.0	-15.2

2.4 Modes of Description

Mode #	Mode	Comments
1	UMTS Band 5 Note1)	Rx Frequency range: (869 to 894) MHz
2	LTE Band 5 Note1)	Rx Frequency range: (869 to 894) MHz
3	LTE Band 12 Note1)	Rx Frequency range: (729 to 746) MHz
4	LTE Band 13 Note1)	Rx Frequency range: (746 to 756) MHz
5	LTE Band 14 Note1)	Rx Frequency range: (758 to 768) MHz
6	LTE Band 71 Note1)	Rx Frequency range: (617 to 652) MHz

Note1) The EUT Tested while operating in licensed band (Receiver Mode)

2.5 Configuration

Description	
#1	

3. Test Condition and Results

3.1 Radiated Emissions

TEST: Limits for radiated disturbance				
Method	Measurements were made in a 10-meter semi-anechoic chamber that complies to ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 10-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at 1, 2, 3 and 4 meter heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.			
Parameters recorded during the test	Laboratory Ambient Temperature		(20.7 - 21.1) °C	
	Relative Humidity		(45.4 - 47.3) %	
	Frequency range		**Measurement Point**	
Fully configured sample scanned over the following frequency range	30 MHz – 1 000 MHz		3 meter measurement distance	
	1 000 MHz – 6 000 MHz		3 meter measurement distance	
Limits – Class B				
Frequency (MHz)	Limit (dBµV/m)			
Below 1 GHz	Quasi-Peak		Results	
30 to 88	40		**Pass**	
88 to 216	43.5		**Pass**	
216 to 960	46		**Pass**	
960 to 1 000	54		**Pass**	
Above 1 GHz	Average	Peak	Result	
1 000 to 6 000	54	74	**Pass**	**Pass**
EUT Configuration Settings:				
Power Interface Mode # (See Section 3.3)	EUT Operation Mode # (See Section 3.4)		EUT Configurations Mode # (See Section 3.5)	
1	1, 2, 3, 4, 5, 6		1	

Note1) Formula
Final Value (PK and/or QP and/or CAV) = Reading Value (PK and/or QP and/or CAV) + Corr. (Antenna Factor + Cable Loss + Distance Correction - Amplifier Gain)
Margin (PK and/or QP and/or CAV) = Limit – Final Value (PK and/or QP and/or CAV)
PK = Peak, QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor
Note2) Distance (Antenna to Centre of Turntable), Antenna Height
Below 1 GHz, Distance = 3 m, Antenna Height = (1 to 4) m
Above 1 GHz, Distance = 4.5 m, Antenna Height (Considering size of EUT) = (1 to 4) m
Distance Correction = 20 log (d2 (m) / d1 (m)) = 20 log (4.5 / 3) = **3.5**

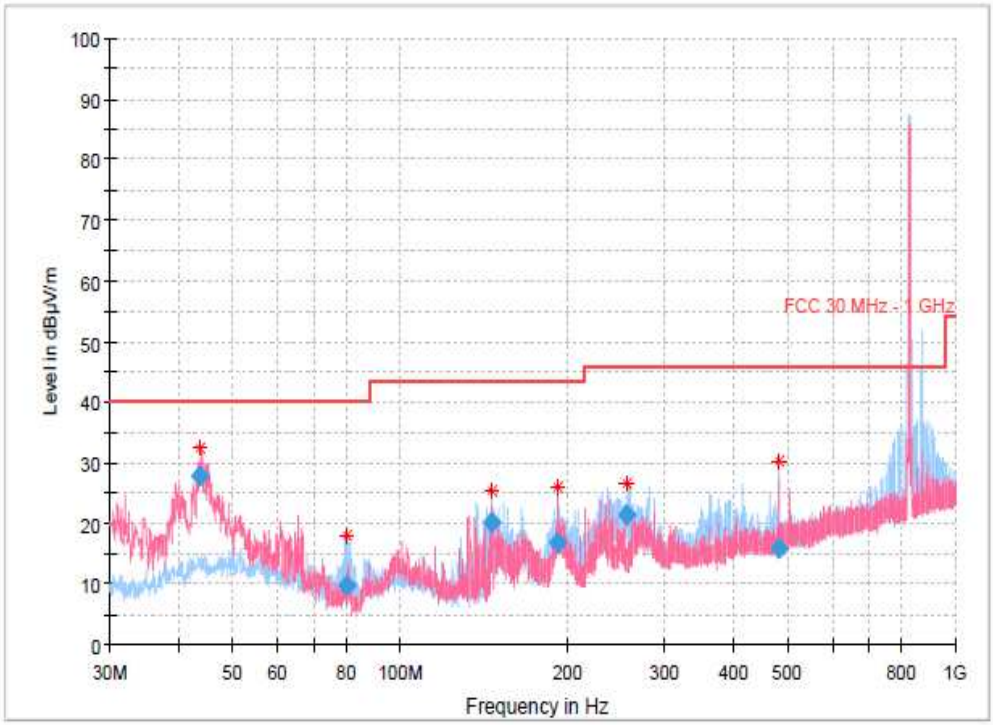
Table 1. Radiated emission Test data

Below 1 GHz (Mode1: UMTS Band 5 - Low CHANNEL 871.4 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.656500	27.96	40.00	12.04	100.0	V	0.0	-20.0
80.258000	9.74	40.00	30.26	200.0	H	355.0	-27.1
146.211000	20.22	43.50	23.28	100.0	H	104.0	-25.8
191.990000	16.74	43.50	26.76	100.0	V	356.0	-22.6
256.468500	21.39	46.00	24.61	100.0	H	28.0	-20.2
479.831500	15.90	46.00	30.10	200.0	H	6.0	-15.2

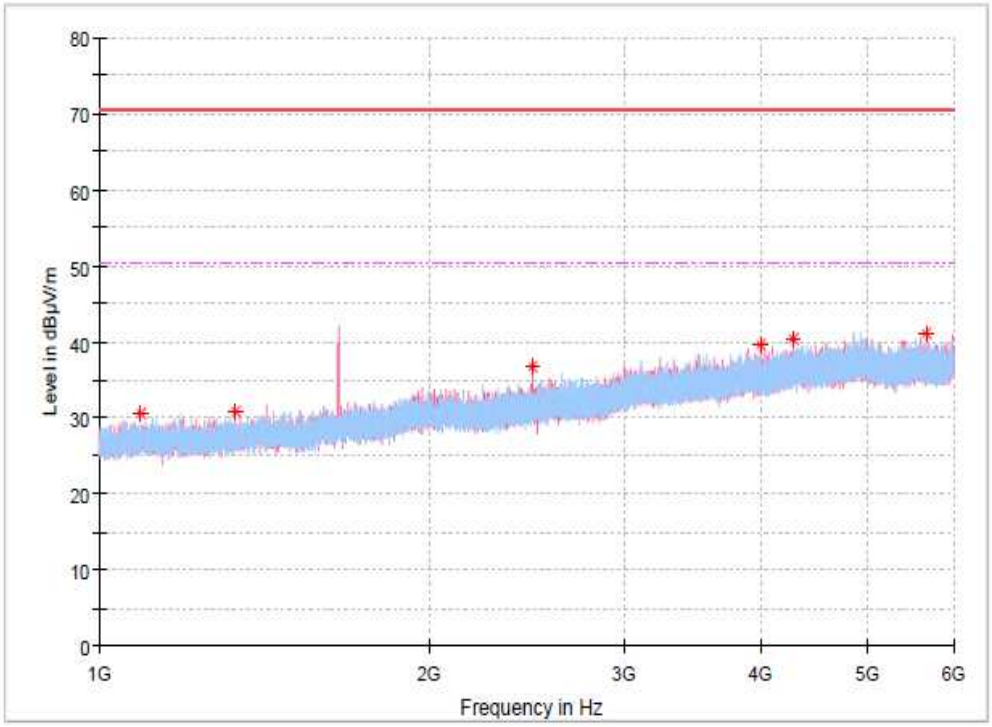
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode1: UMTS Band 5 - Low CHANNEL 871.4 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1091.875000	30.48	70.50	40.02	100.0	H	237.0	-11.6
1332.875000	30.87	70.50	39.63	100.0	V	167.0	-10.3
2477.000000	36.68	70.50	33.82	100.0	V	226.0	-4.6
3997.500000	39.73	70.50	30.77	100.0	V	135.0	0.8
4278.250000	40.40	70.50	30.10	100.0	V	0.0	2.1
5668.875000	41.08	70.50	29.42	100.0	H	248.0	4.1

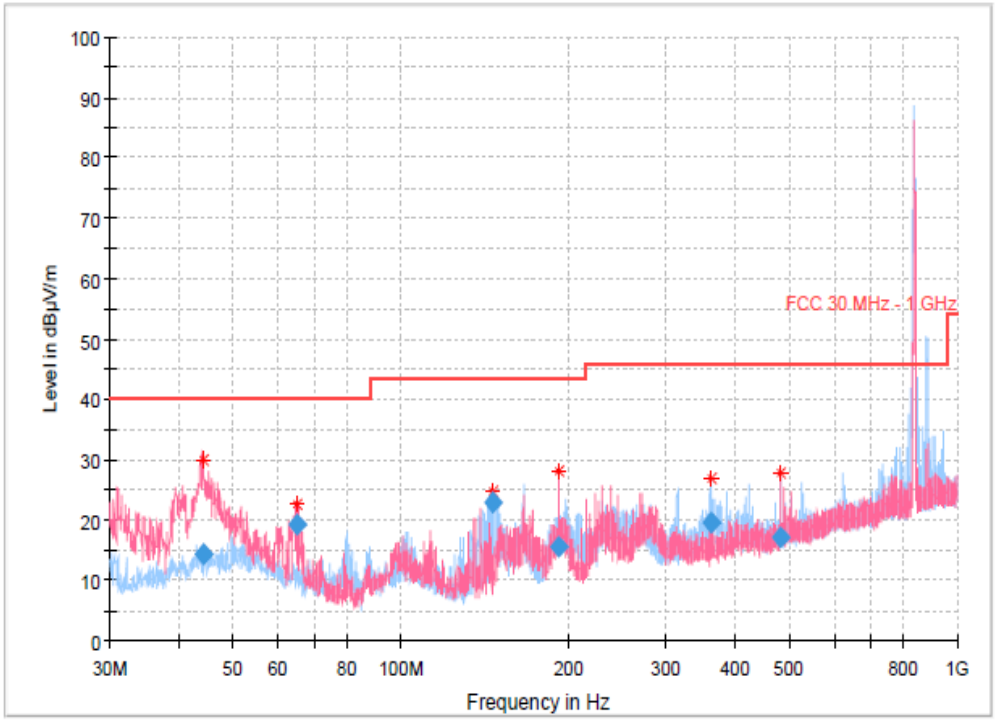
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode1: UMTS Band 5 - Middle CHANNEL 881.6 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.254000	14.41	40.00	25.59	100.0	V	63.0	-19.9
65.214500	19.17	40.00	20.83	100.0	V	6.0	-22.8
146.034000	23.05	43.50	20.45	200.0	H	123.0	-25.8
192.510000	15.57	43.50	27.93	200.0	H	203.0	-22.5
360.274000	19.50	46.00	26.50	100.0	H	209.0	-18.0
479.943000	17.15	46.00	28.85	200.0	V	0.0	-15.2

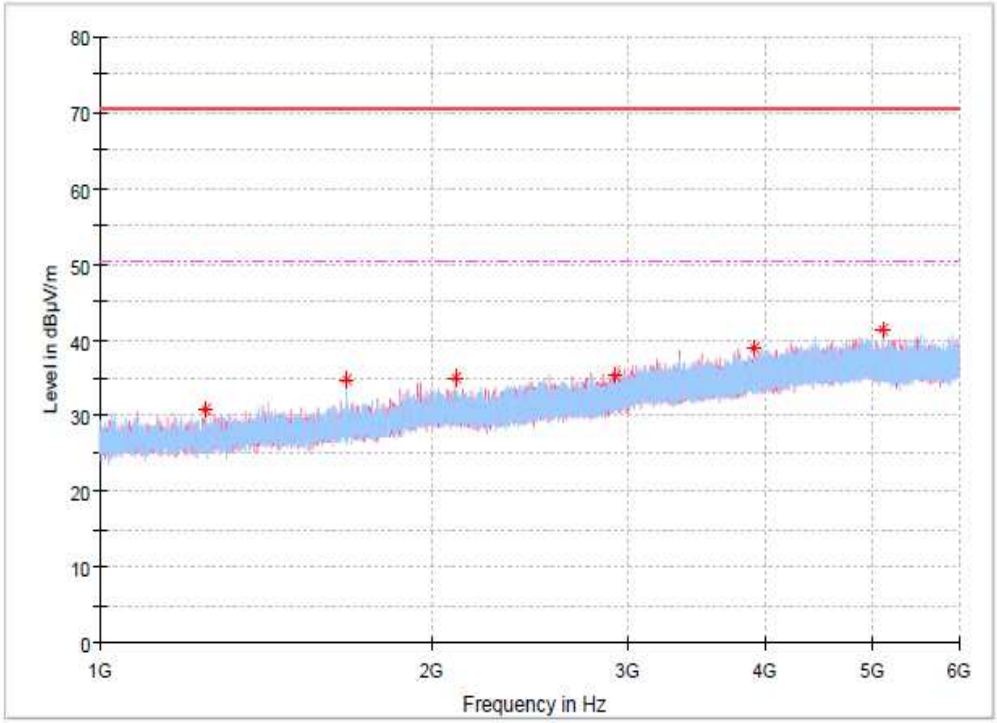
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode1: UMTS Band 5 - Middle CHANNEL 881.6 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1246.625000	30.87	70.50	39.63	100.0	H	73.0	-11.1
1671.000000	34.76	70.50	35.74	100.0	H	1.0	-8.2
2098.375000	35.04	70.50	35.46	100.0	V	190.0	-6.1
2933.000000	35.33	70.50	35.17	100.0	V	333.0	-3.3
3917.375000	38.96	70.50	31.54	100.0	V	249.0	0.7
5112.250000	41.44	70.50	29.06	100.0	H	228.0	3.4

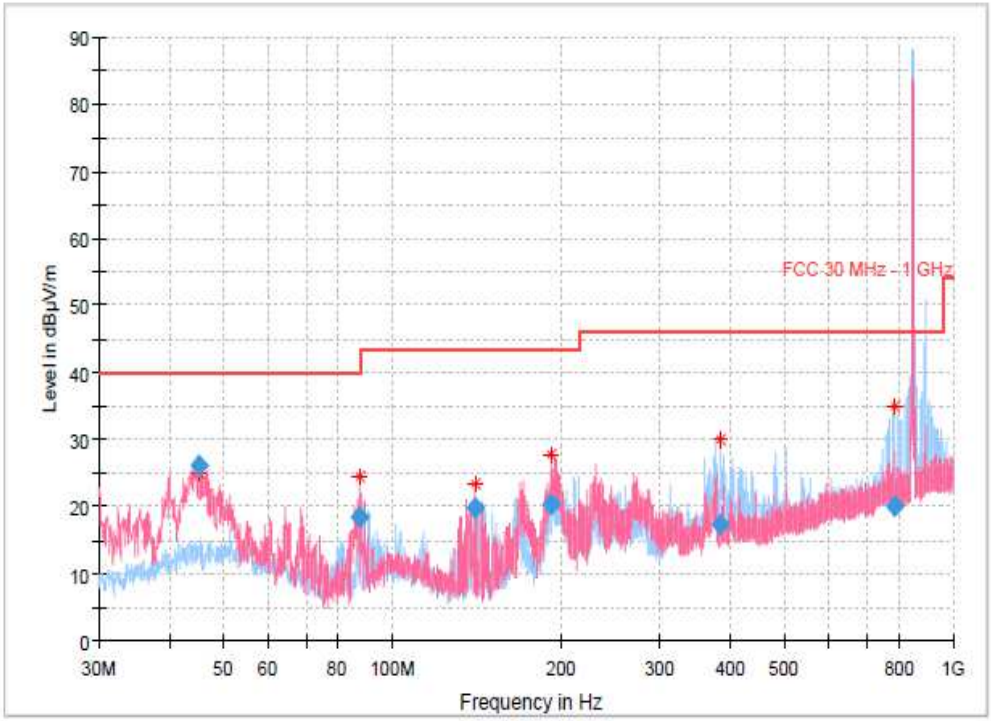
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode1: UMTS Band 5 - High CHANNEL 891.6 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.274000	26.23	40.00	13.77	100.0	V	181.0	-19.8
87.218000	18.45	40.00	21.55	100.0	V	14.0	-25.0
140.591000	19.84	43.50	23.66	100.0	V	282.0	-25.8
192.390000	20.34	43.50	23.16	100.0	V	204.0	-22.5
384.041500	17.35	46.00	28.65	100.0	H	289.0	-17.1
787.190500	20.16	46.00	25.84	100.0	H	198.0	-10.7

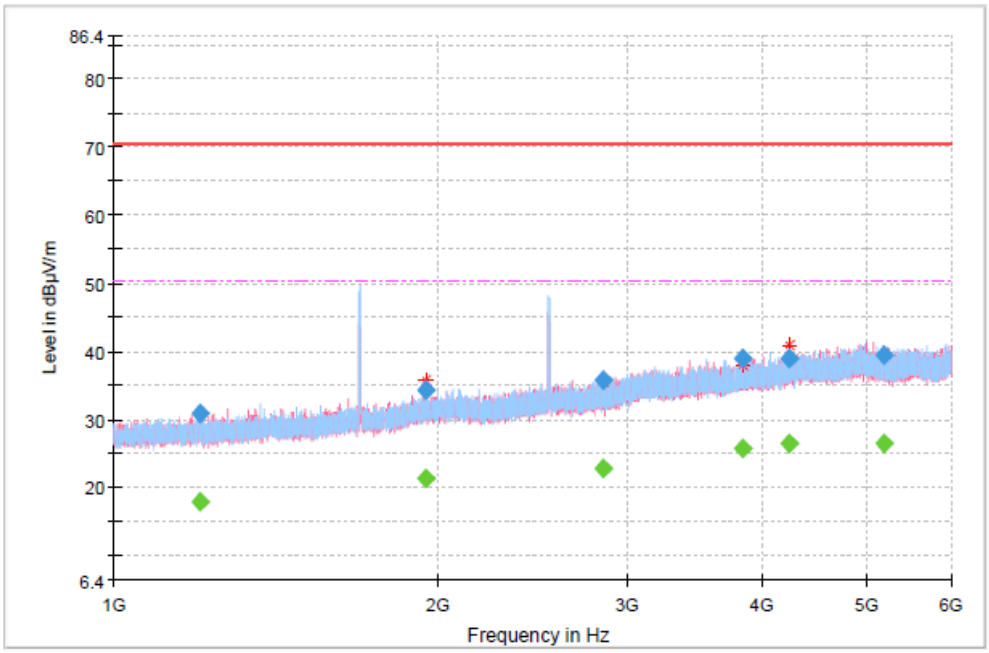
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode1: UMTS Band 5 - High CHANNEL 891.6 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1203.925000	30.82	---	70.50	39.68	200.0	H	286.0	-11.3
1203.925000	---	17.99	50.50	32.51	200.0	H	286.0	-11.3
1952.450000	---	21.26	50.50	29.24	100.0	V	118.0	-6.6
1952.450000	34.23	---	70.50	36.27	100.0	V	118.0	-6.6
2848.000000	35.86	---	70.50	34.64	300.0	H	66.0	-3.8
2848.000000	---	22.74	50.50	27.76	300.0	H	66.0	-3.8
3846.425000	---	25.64	50.50	24.86	100.0	V	358.0	0.5
3846.425000	39.03	---	70.50	31.47	100.0	V	358.0	0.5
4247.800000	38.98	---	70.50	31.52	300.0	H	245.0	1.9
4247.800000	---	26.39	50.50	24.11	300.0	H	245.0	1.9
5201.575000	39.42	---	70.50	31.08	300.0	H	13.0	3.3
5201.575000	---	26.53	50.50	23.97	300.0	H	13.0	3.3

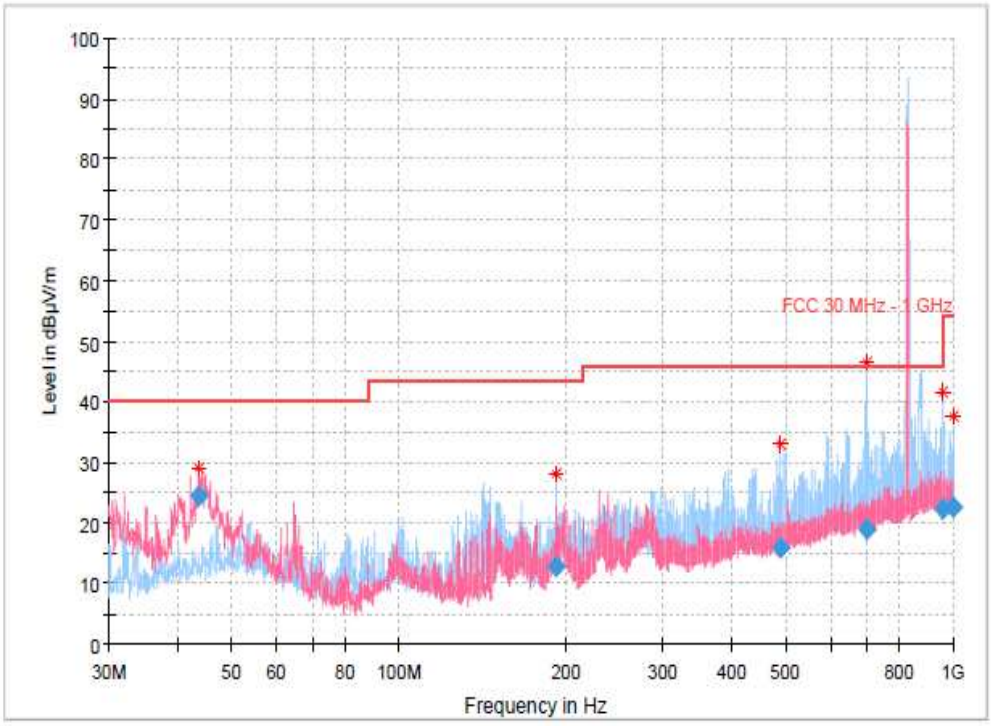
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode2: LTE Band 5 - Low CHANNEL 874 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	21.1 'C / 45.4 % R.H. / 100.3 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.610500	24.44	40.00	15.56	100.0	V	77.0	-20.0
191.910000	12.83	43.50	30.67	100.0	H	222.0	-22.6
487.344000	16.03	46.00	29.97	100.0	H	60.0	-14.9
697.606000	18.83	46.00	27.17	100.0	H	60.0	-11.9
956.218000	22.22	46.00	23.78	100.0	H	60.0	-9.5
997.637000	22.70	54.00	31.30	100.0	H	60.0	-9.1

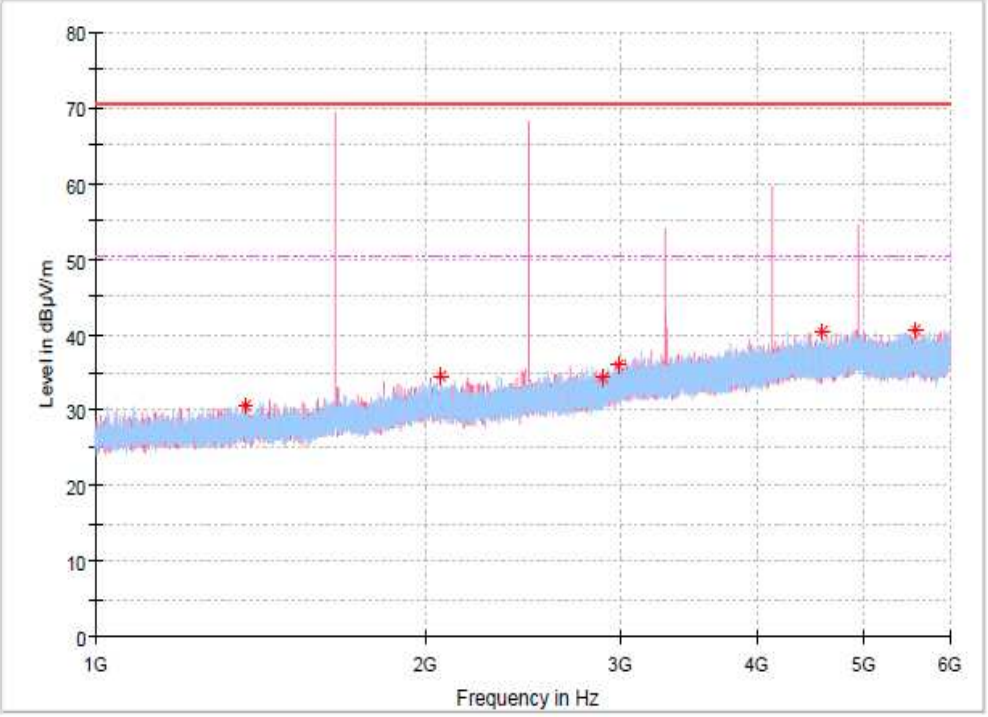
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode2: LTE Band 5 - Low CHANNEL 874 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1371.750000	30.54	70.50	39.96	100.0	V	101.0	-9.9
2065.875000	34.48	70.50	36.02	100.0	H	189.0	-6.1
2903.125000	34.24	70.50	36.26	100.0	V	339.0	-3.5
2992.625000	35.97	70.50	34.53	100.0	H	305.0	-2.8
4589.750000	40.28	70.50	30.22	100.0	H	126.0	2.3
5586.750000	40.51	70.50	29.99	100.0	V	0.0	4.2

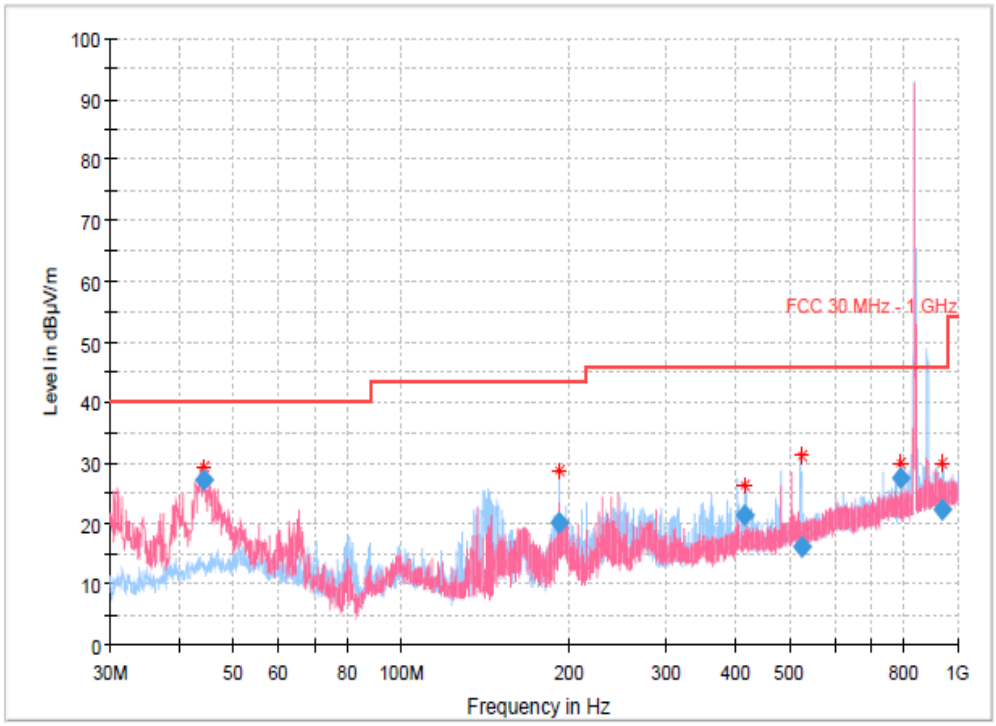
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode2: LTE Band 5 - Middle CHANNEL 881.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	21.1 'C / 45.4 % R.H. / 100.3 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.277000	27.17	40.00	12.83	100.0	V	113.0	-19.9
192.350000	20.07	43.50	23.43	100.0	H	231.0	-22.6
414.921500	21.41	46.00	24.59	100.0	H	0.0	-16.2
522.589000	16.10	46.00	29.90	100.0	H	78.0	-14.4
787.150500	27.43	46.00	18.57	100.0	H	145.0	-10.7
940.470000	22.38	46.00	23.62	100.0	H	115.0	-9.3

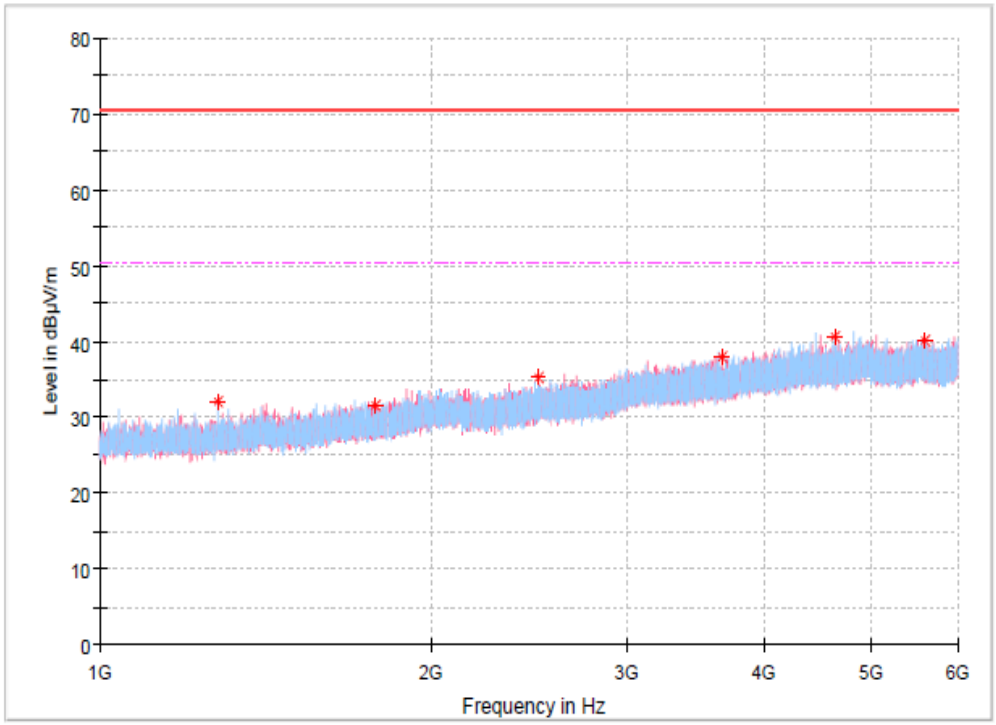
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode2: LTE Band 5 - Middle CHANNEL 881.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1278.500000	32.10	70.50	38.40	100.0	H	156.0	-10.9
1777.375000	31.47	70.50	39.03	100.0	V	1.0	-8.0
2500.750000	35.31	70.50	35.19	100.0	H	319.0	-4.5
3666.875000	37.86	70.50	32.64	100.0	V	0.0	-0.3
4645.625000	40.50	70.50	30.00	100.0	H	50.0	2.4
5596.500000	40.24	70.50	30.26	100.0	H	85.0	4.2

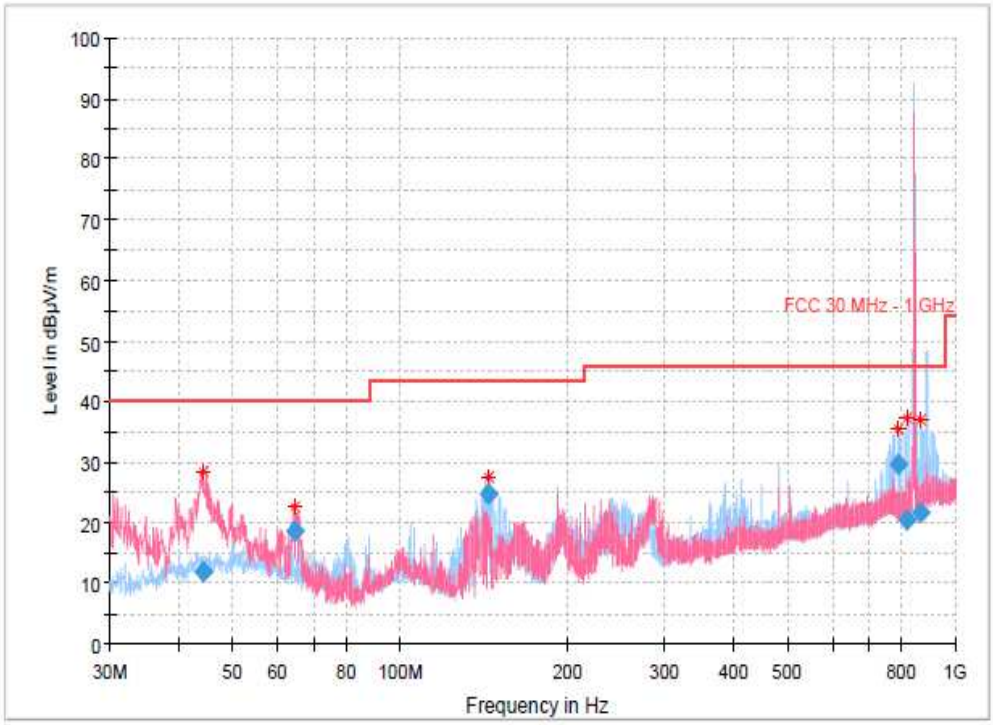
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode2: LTE Band 5 - High CHANNEL 889 MHz)

Test Report

Common Information

Project Number	200414K003
Location	10 m SAC
System:	Below 30 MHz
Environment	21.1 'C / 45.4 % R.H. / 100.3 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.259000	11.93	40.00	28.07	200.0	V	0.0	-19.9
64.435000	18.73	40.00	21.27	100.0	V	42.0	-22.6
144.217500	24.87	43.50	18.63	200.0	H	126.0	-25.8
787.230500	29.55	46.00	16.45	100.0	H	204.0	-10.7
817.931000	20.41	46.00	25.59	100.0	H	204.0	-10.4
864.006000	21.61	46.00	24.39	100.0	H	204.0	-9.8

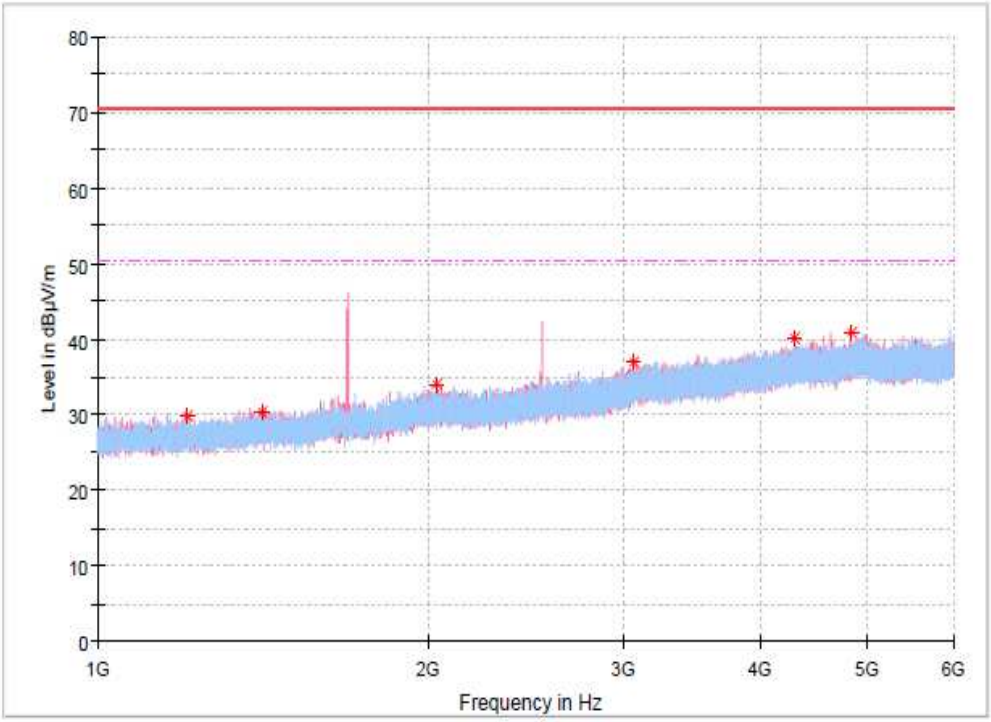
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode2: LTE Band 5 - High CHNNEL 889 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1207.500000	29.74	70.50	40.76	100.0	V	298.0	-11.3
1409.125000	30.35	70.50	40.15	100.0	H	172.0	-9.6
2030.750000	33.93	70.50	36.57	100.0	V	204.0	-6.2
3068.625000	36.97	70.50	33.53	100.0	V	159.0	-2.0
4294.375000	40.11	70.50	30.39	100.0	H	151.0	2.1
4840.750000	40.74	70.50	29.76	100.0	V	222.0	3.1

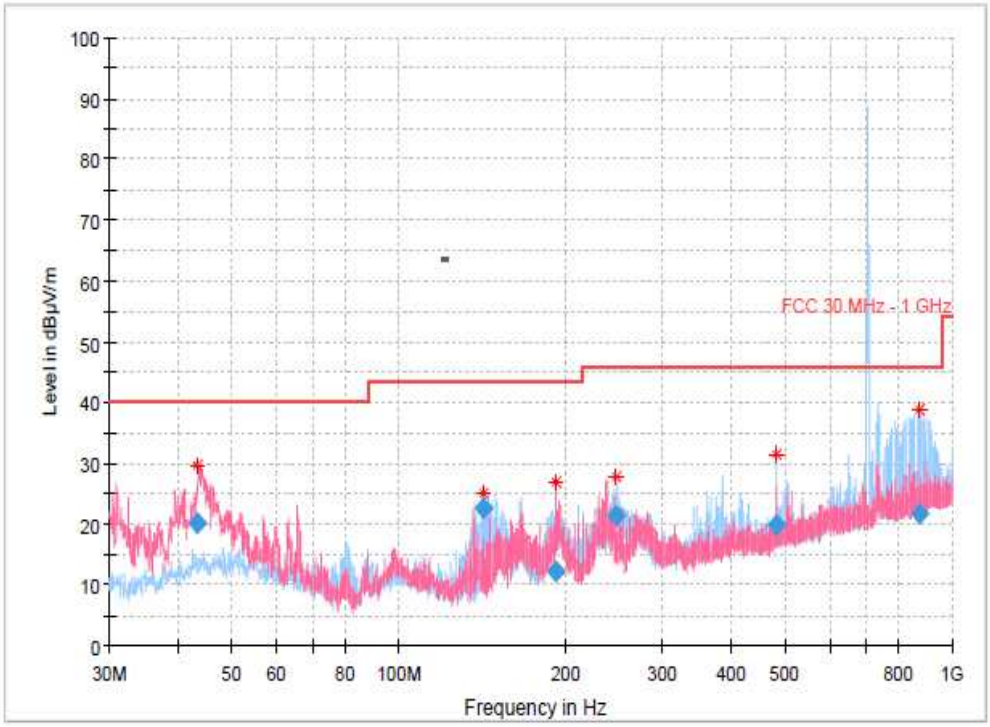
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 824 MHz to 849 MHz and from 869 MHz to 894 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode3: LTE Band 12 - Low CHANNEL 733 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.325500	20.07	40.00	19.93	100.0	V	171.0	-20.0
142.700500	22.52	43.50	20.98	200.0	H	125.0	-25.8
191.990000	12.36	43.50	31.14	100.0	V	208.0	-22.6
247.439000	21.34	46.00	24.66	100.0	H	2.0	-20.3
479.991500	20.02	46.00	25.98	200.0	H	250.0	-15.2
871.677500	21.82	46.00	24.18	100.0	H	46.0	-9.7

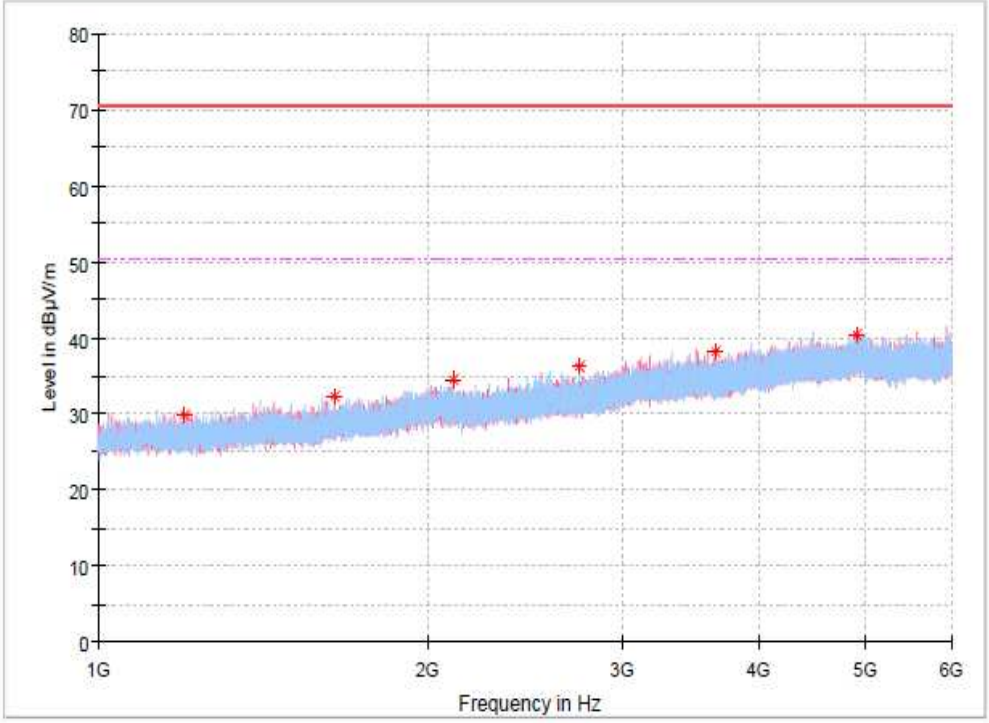
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode3: LTE Band 12 - Low CHANNEL 733 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1198.500000	29.90	70.50	40.60	100.0	H	253.0	-11.3
1640.750000	32.23	70.50	38.27	100.0	V	19.0	-8.3
2110.500000	34.41	70.50	36.09	100.0	H	82.0	-6.1
2746.125000	36.29	70.50	34.21	100.0	H	180.0	-4.1
3659.625000	38.18	70.50	32.32	100.0	H	352.0	-0.4
4925.250000	40.36	70.50	30.14	100.0	V	80.0	3.4

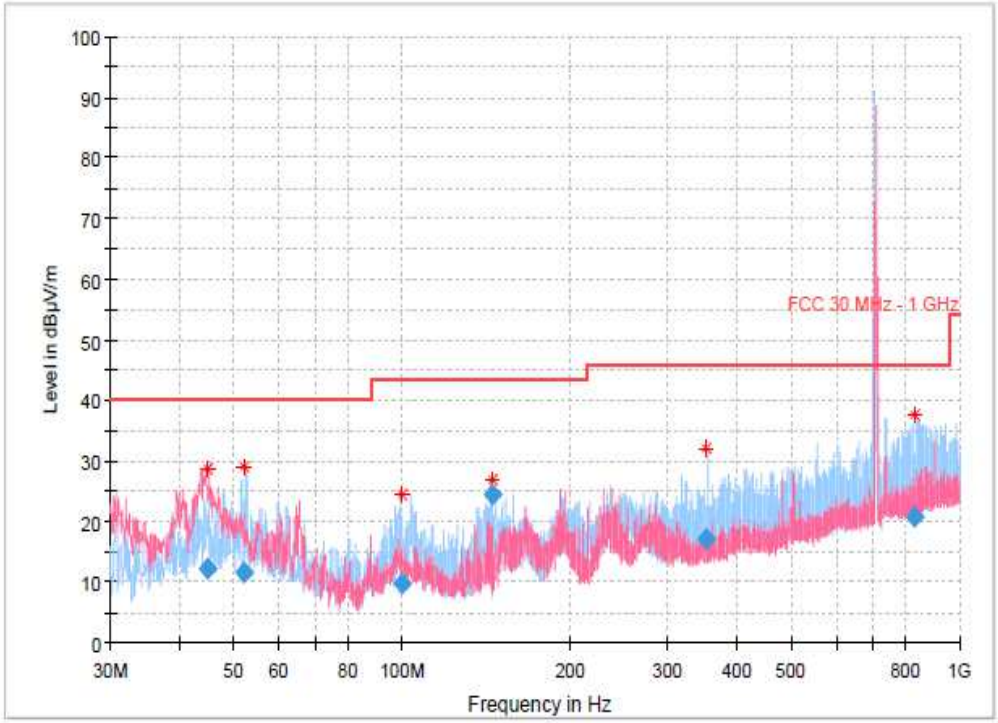
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode3: LTE Band 12 - Middle CHANNEL 737 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.740500	12.32	40.00	27.68	100.0	V	0.0	-19.8
52.161000	11.58	40.00	28.42	100.0	H	183.0	-20.0
99.778000	9.91	43.50	33.59	100.0	H	183.0	-22.2
145.085500	24.61	43.50	18.89	200.0	H	99.0	-25.8
352.262000	16.98	46.00	29.02	100.0	H	183.0	-17.5
832.785500	20.93	46.00	25.07	200.0	H	183.0	-10.3

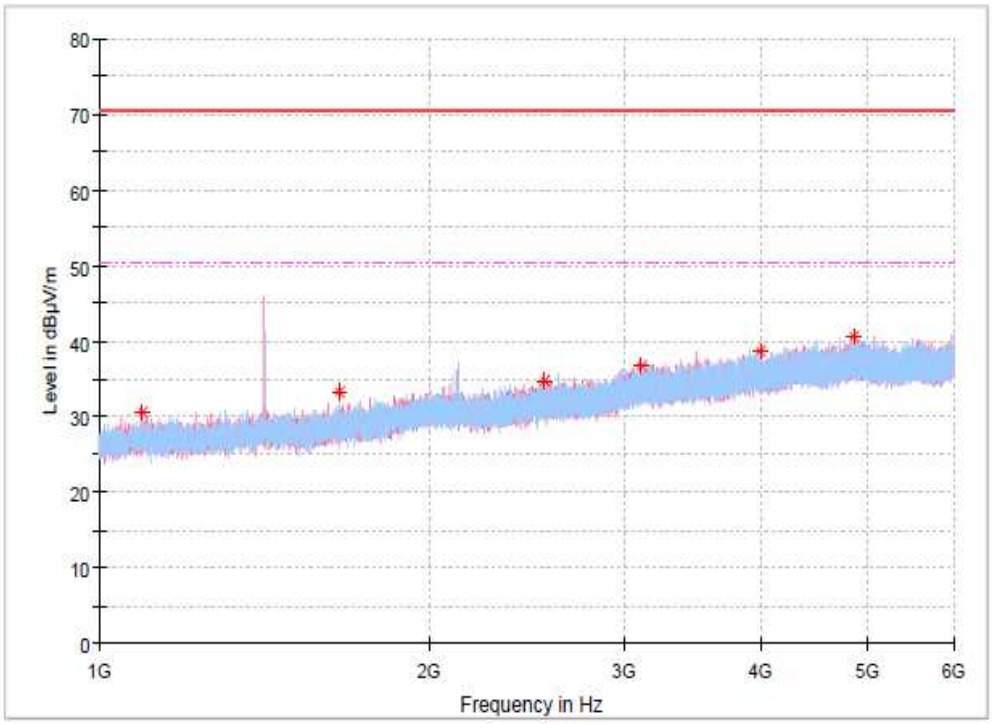
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode3: LTE Band 12 - Middle CHANNEL 737 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1093.625000	30.50	70.50	40.00	100.0	V	208.0	-11.6
1651.750000	33.25	70.50	37.25	100.0	H	354.0	-8.2
2541.000000	34.76	70.50	35.74	100.0	H	28.0	-4.3
3114.875000	36.65	70.50	33.85	100.0	H	329.0	-1.7
3995.625000	38.61	70.50	31.89	100.0	H	145.0	0.8
4870.375000	40.55	70.50	29.95	100.0	H	285.0	3.3

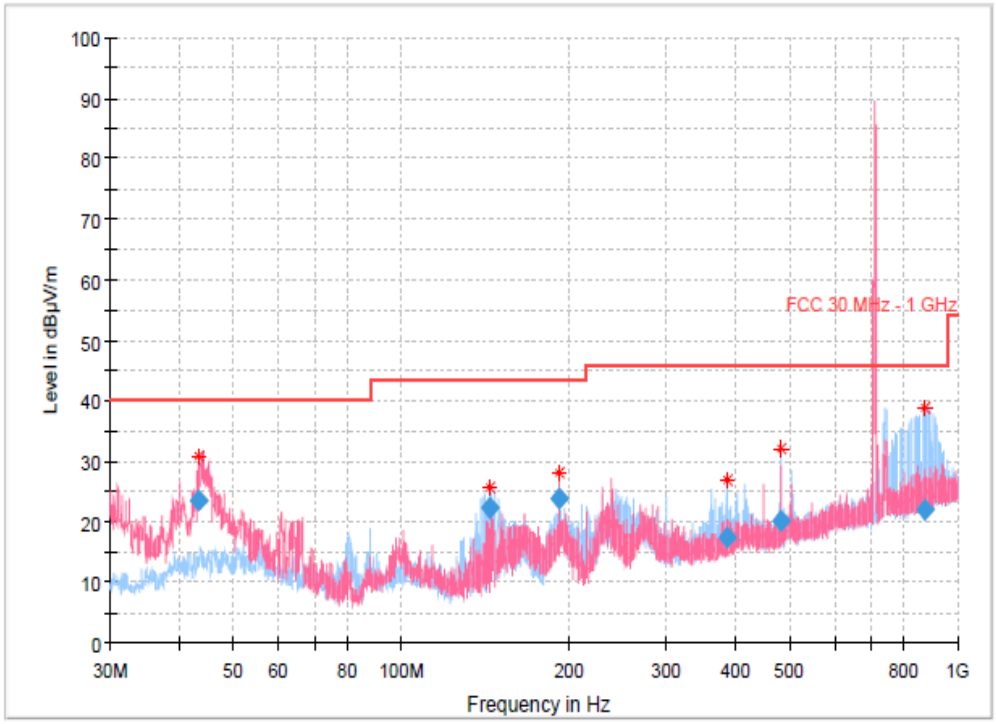
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode3: LTE Band 12 - High CHANNEL 741 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.285500	23.55	40.00	16.45	100.0	V	120.0	-20.0
144.565500	22.22	43.50	21.28	200.0	H	292.0	-25.8
191.950000	23.98	43.50	19.52	100.0	V	214.0	-22.6
384.650000	17.30	46.00	28.70	100.0	H	14.0	-17.1
479.991500	20.07	46.00	25.93	200.0	H	238.0	-15.2
871.357500	22.10	46.00	23.90	100.0	H	48.0	-9.7

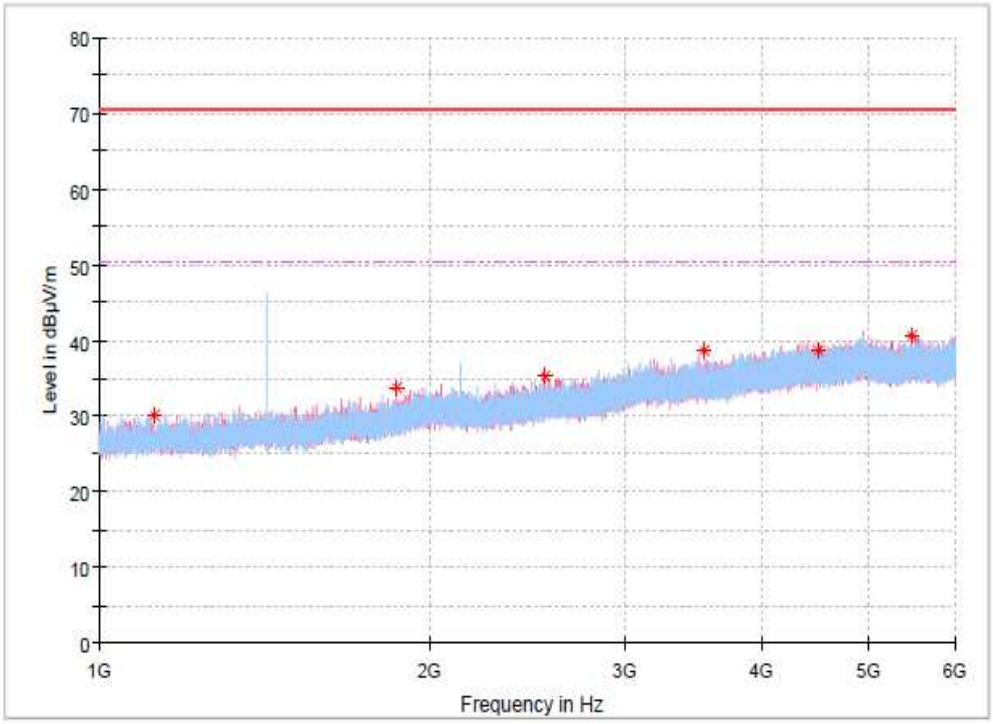
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode3: LTE Band 12 - High CHANNEL 741 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1121.625000	30.15	70.50	40.35	100.0	H	207.0	-11.6
1861.500000	33.72	70.50	36.78	100.0	V	211.0	-7.4
2547.875000	35.17	70.50	35.33	100.0	V	105.0	-4.4
3553.875000	38.71	70.50	31.79	100.0	H	192.0	-0.4
4506.500000	38.61	70.50	31.89	100.0	H	270.0	2.3
5483.875000	40.49	70.50	30.01	100.0	V	109.0	4.0

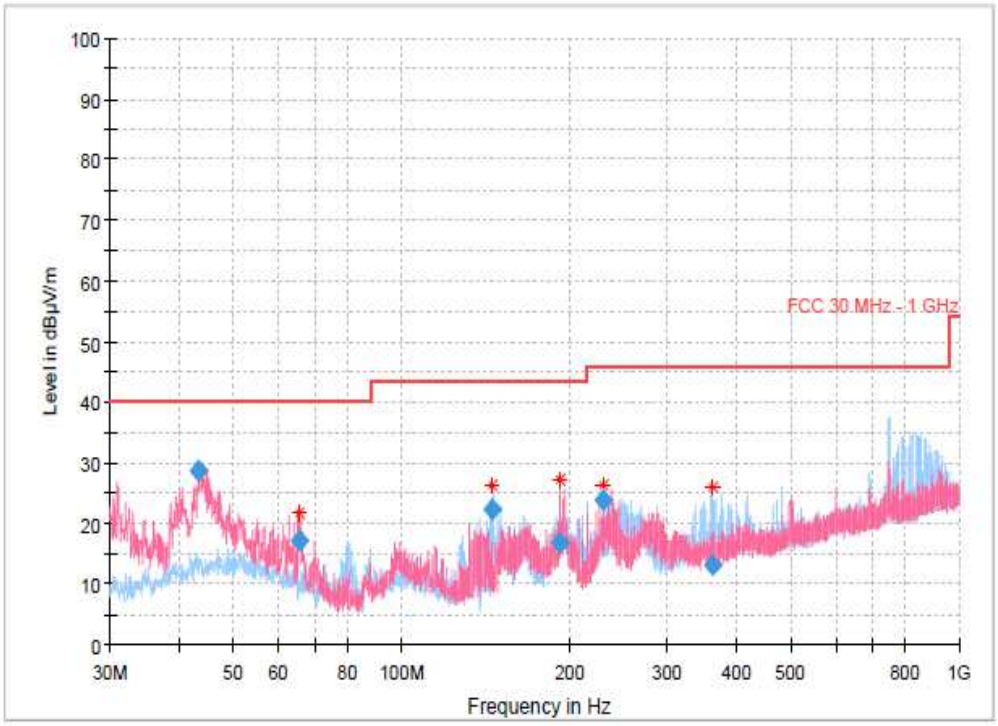
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 689 MHz to 716 MHz and from 728 MHz to 746 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode4: LTE Band 13 - Low CHANNEL 743.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.240500	28.87	40.00	11.13	100.0	V	14.0	-20.0
65.442500	17.26	40.00	22.74	100.0	V	344.0	-22.9
145.606000	22.19	43.50	21.31	200.0	H	124.0	-25.8
191.870000	16.93	43.50	26.57	100.0	H	254.0	-22.7
230.402000	23.79	46.00	22.21	100.0	V	23.0	-21.3
360.042500	13.03	46.00	32.97	100.0	H	273.0	-18.0

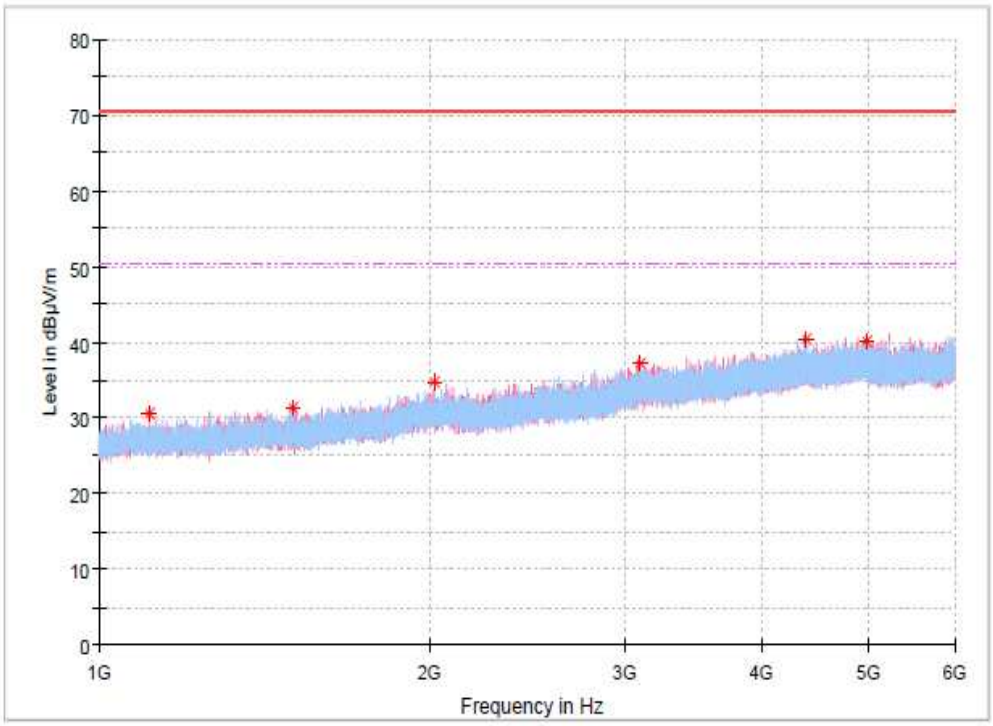
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode4: LTE Band 13 - Low CHNNEL 743.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1109.750000	30.54	70.50	39.96	100.0	V	171.0	-11.6
1500.500000	31.40	70.50	39.10	100.0	H	274.0	-9.0
2016.875000	34.83	70.50	35.67	100.0	H	323.0	-6.2
3105.500000	37.18	70.50	33.32	100.0	V	224.0	-1.7
4390.375000	40.36	70.50	30.14	100.0	H	313.0	2.3
4989.375000	40.02	70.50	30.48	100.0	V	218.0	3.5

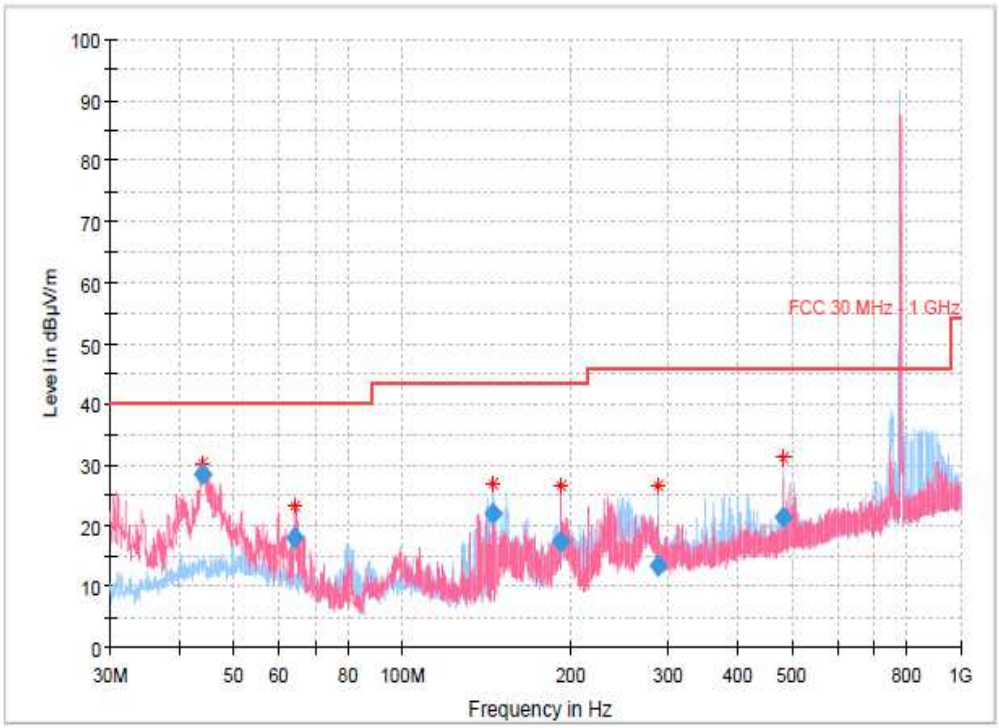
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode4: LTE Band 13 - Middle CHANNEL 751 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.779000	28.31	40.00	11.69	100.0	V	78.0	-20.0
63.986500	18.08	40.00	21.92	100.0	V	41.0	-22.4
145.521000	22.07	43.50	21.43	200.0	H	301.0	-25.8
192.390000	17.47	43.50	26.03	100.0	V	0.0	-22.5
288.131500	13.45	46.00	32.56	100.0	H	71.0	-19.7
479.991500	21.44	46.00	24.56	200.0	H	28.0	-15.2

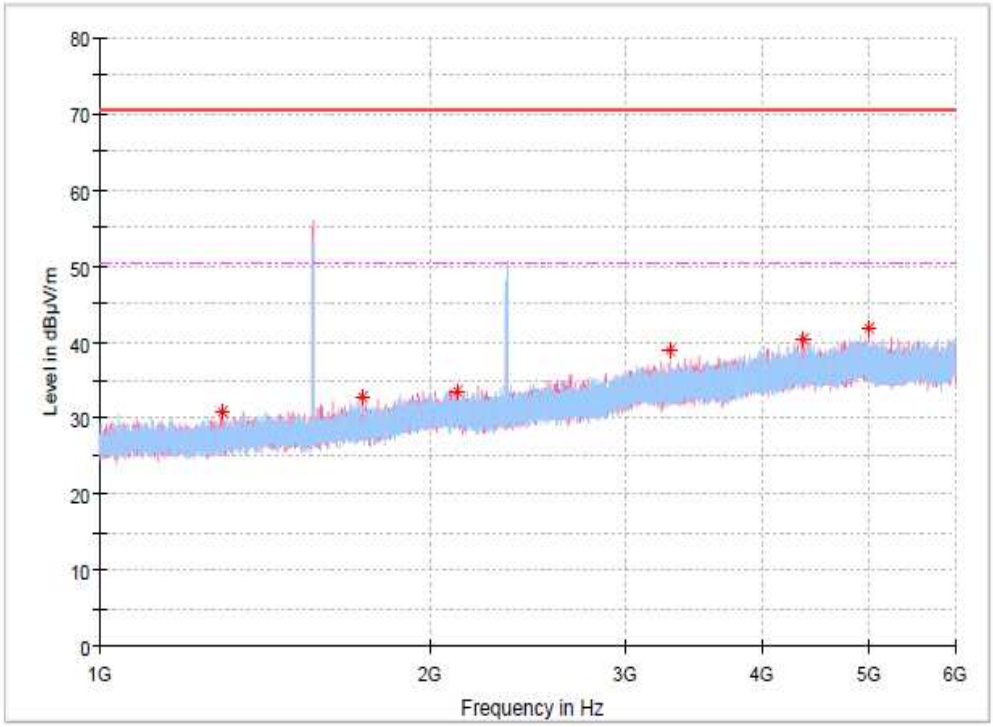
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode4: LTE Band 13 - Middle CHNNEL 751 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1294.000000	30.72	70.50	39.78	100.0	V	62.0	-10.8
1732.000000	32.90	70.50	37.60	100.0	V	279.0	-8.1
2113.375000	33.41	70.50	37.09	100.0	V	291.0	-6.1
3299.750000	38.84	70.50	31.66	100.0	H	159.0	-1.4
4370.375000	40.35	70.50	30.15	100.0	V	180.0	2.3
5007.375000	41.79	70.50	28.71	100.0	V	208.0	3.5

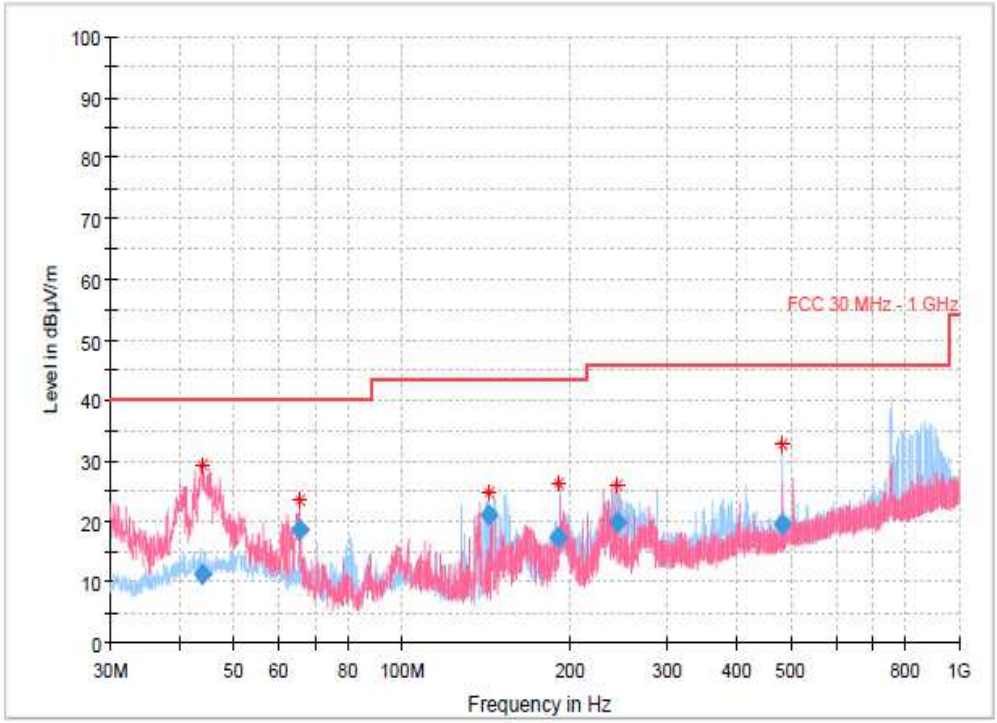
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode4: LTE Band 13 - High CHANNEL 753.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.725500	11.21	40.00	28.79	200.0	H	97.0	-20.0
65.502000	18.67	40.00	21.33	100.0	V	192.0	-22.9
143.468000	21.08	43.50	22.42	200.0	H	97.0	-25.8
191.390000	17.36	43.50	26.14	200.0	H	30.0	-22.8
244.262000	19.92	46.00	26.08	100.0	H	67.0	-20.5
479.991500	19.58	46.00	26.43	200.0	H	26.0	-15.2

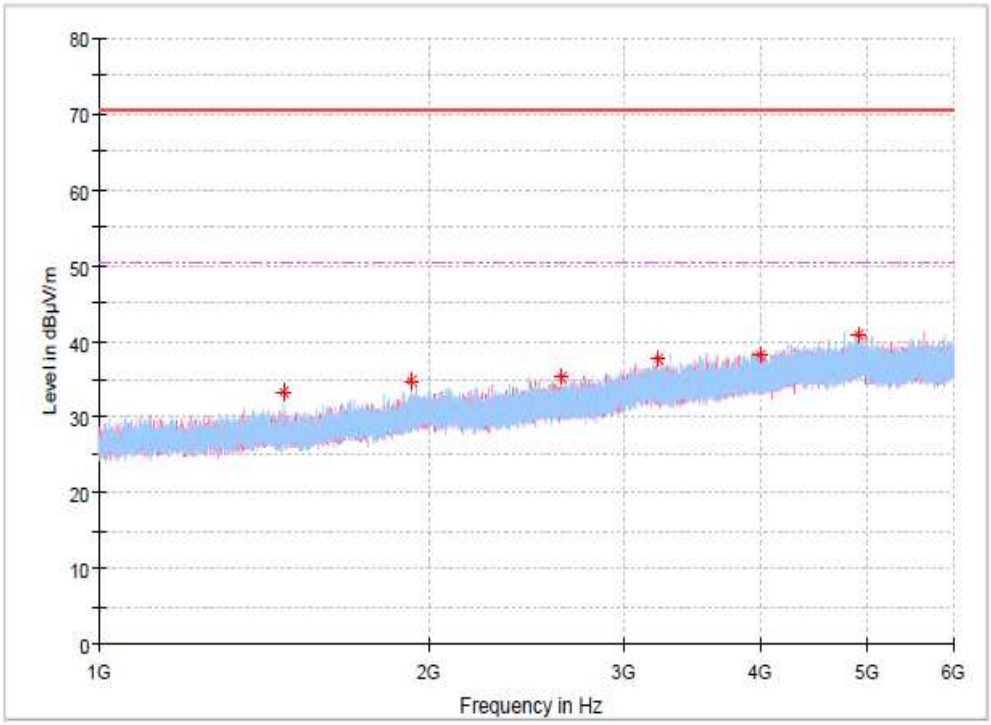
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode4: LTE Band 13 - High CHNNEL 753.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1471.875000	33.34	70.50	37.16	100.0	H	42.0	-9.3
1927.625000	34.63	70.50	35.87	100.0	H	242.0	-6.8
2634.625000	35.29	70.50	35.21	100.0	V	28.0	-4.0
3234.500000	37.68	70.50	32.82	100.0	H	188.0	-1.5
4001.125000	38.16	70.50	32.34	100.0	H	209.0	0.8
4910.750000	40.74	70.50	29.76	100.0	V	305.0	3.4

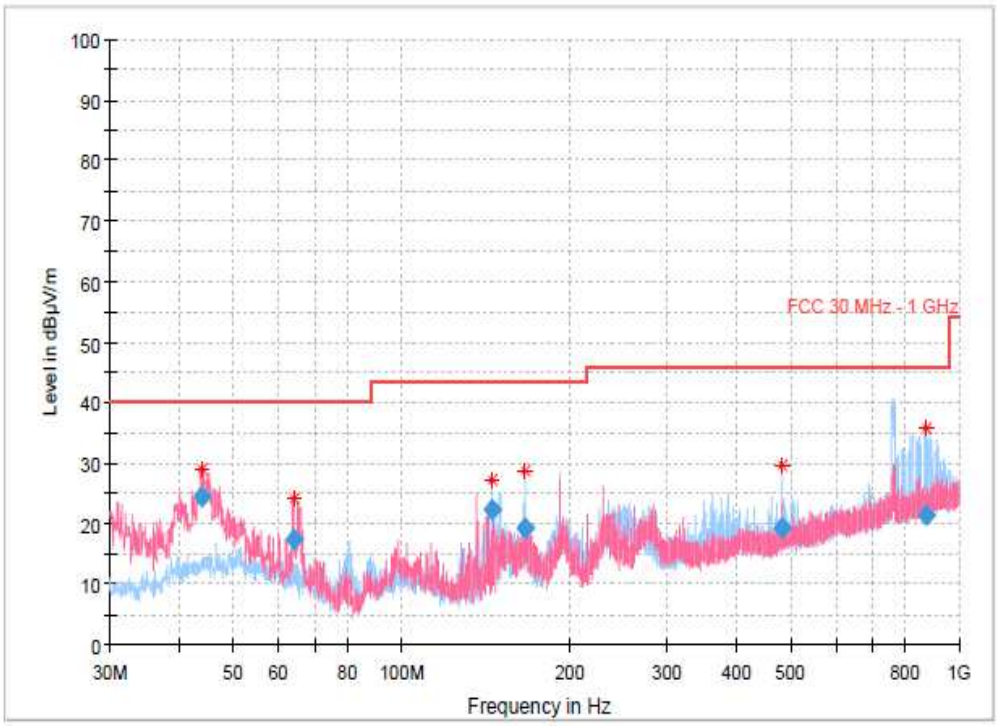
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 777 MHz to 787 MHz and from 746 MHz to 756 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode5: LTE Band 14 - Low CHANNEL 760.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.762000	24.57	40.00	15.43	100.0	V	106.0	-20.0
64.030000	17.28	40.00	22.72	100.0	V	0.0	-22.4
145.367000	22.31	43.50	21.19	200.0	H	96.0	-25.8
166.442500	19.23	43.50	24.27	200.0	H	230.0	-24.8
479.991500	19.19	46.00	26.81	200.0	H	217.0	-15.2
871.669000	21.50	46.00	24.50	100.0	H	0.0	-9.7

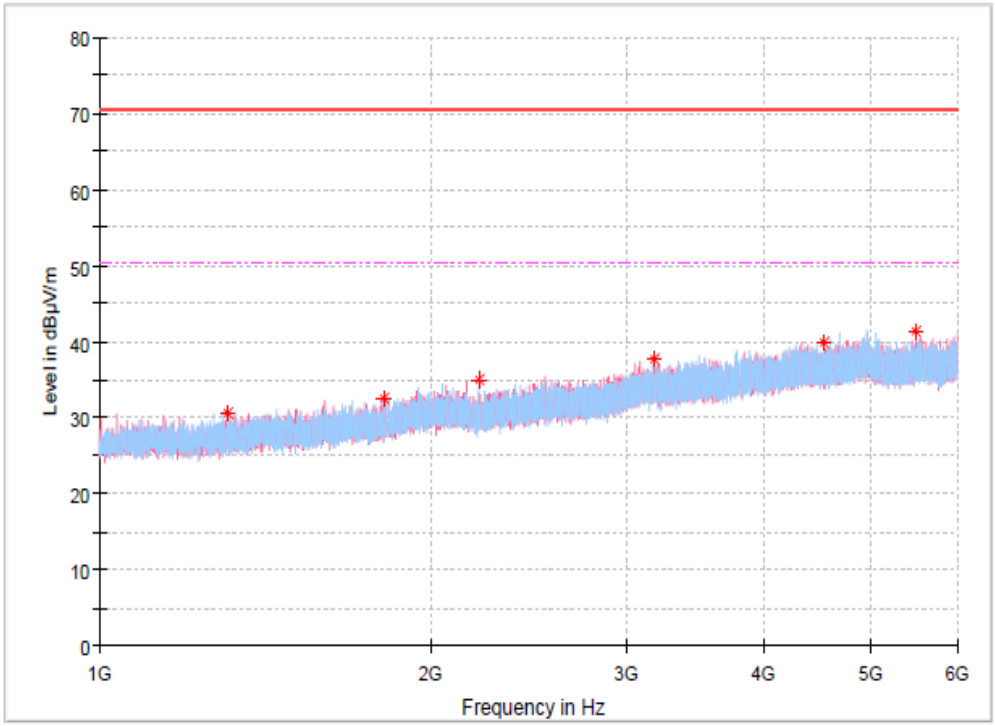
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode5: LTE Band 14 - Low CHANNEL 760.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1305.750000	30.52	70.50	39.98	100.0	H	202.0	-10.7
1811.125000	32.53	70.50	37.97	100.0	H	324.0	-7.8
2209.125000	35.01	70.50	35.49	100.0	H	2.0	-6.4
3182.000000	37.65	70.50	32.85	100.0	V	245.0	-1.5
4546.625000	39.77	70.50	30.73	100.0	H	52.0	2.4
5509.750000	41.24	70.50	29.26	100.0	V	137.0	4.1

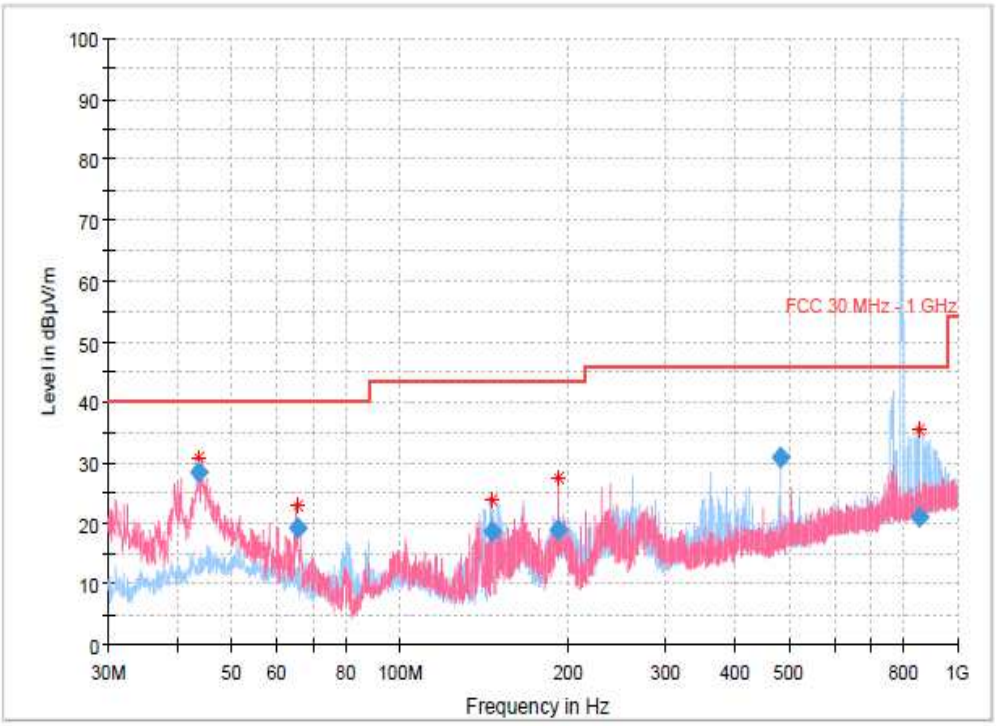
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode5: LTE Band 14 - Middle CHANNEL 763 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.690500	28.38	40.00	11.62	100.0	V	0.0	-20.0
65.345500	19.18	40.00	20.82	100.0	V	12.0	-22.8
146.018000	18.74	43.50	24.76	200.0	H	273.0	-25.8
192.350000	19.05	43.50	24.45	200.0	H	208.0	-22.6
479.991500	30.87	46.00	15.13	200.0	H	233.0	-15.2
856.703000	21.20	46.00	24.80	100.0	H	0.0	-10.0

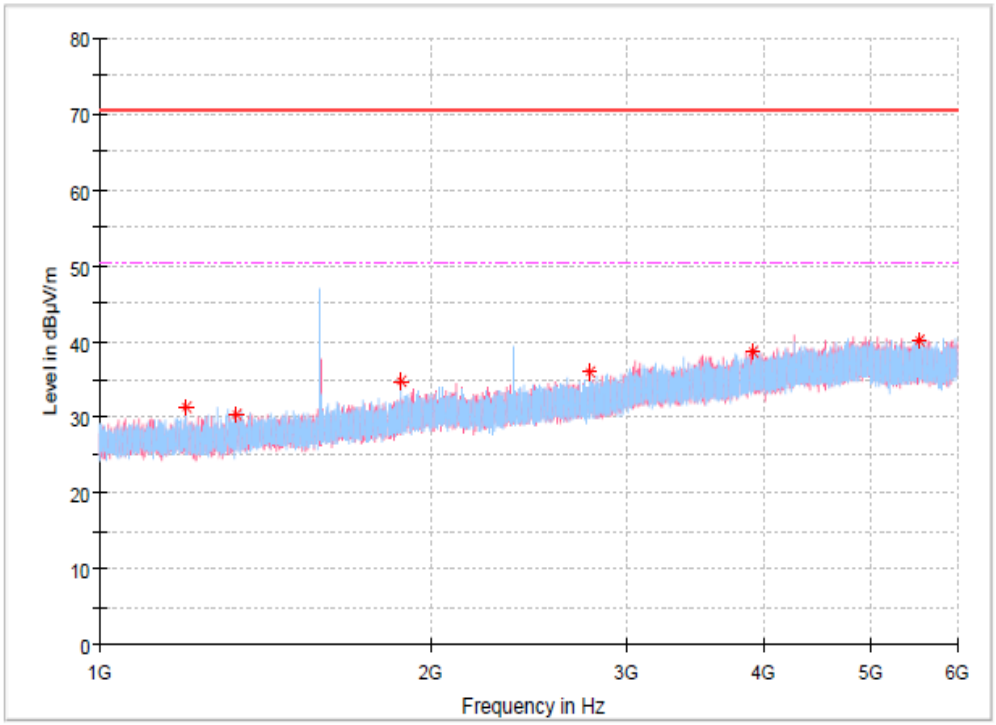
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode5: LTE Band 14 - Middle CHANNEL 763 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1199.125000	31.38	70.50	39.12	100.0	H	0.0	-11.3
1328.875000	30.39	70.50	40.11	100.0	V	196.0	-10.4
1877.000000	34.67	70.50	35.83	100.0	H	236.0	-7.2
2787.750000	36.02	70.50	34.48	100.0	H	0.0	-4.0
3918.875000	38.71	70.50	31.79	100.0	V	112.0	0.7
5546.875000	40.20	70.50	30.30	100.0	V	96.0	4.2

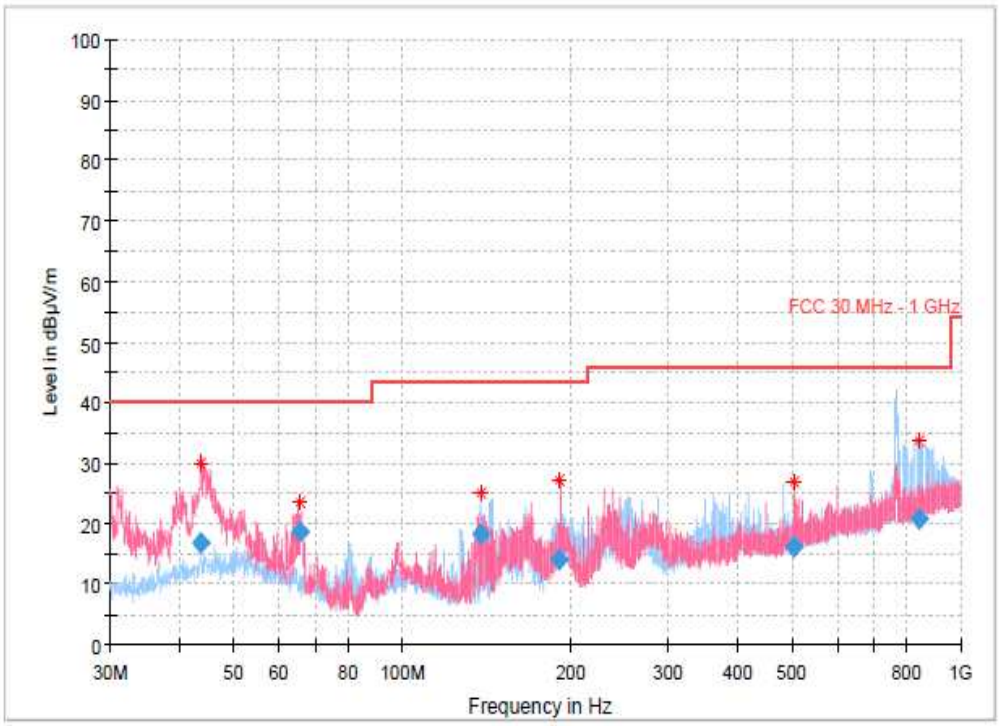
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode5: LTE Band 14 - High CHANNEL 765.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.659000	16.97	40.00	23.03	100.0	V	29.0	-20.0
65.497000	18.77	40.00	21.23	100.0	V	67.0	-22.9
137.740500	18.26	43.50	25.24	200.0	H	103.0	-25.6
191.430000	14.05	43.50	29.45	100.0	H	239.0	-22.7
502.059000	16.32	46.00	29.68	100.0	V	177.0	-14.6
840.528500	20.89	46.00	25.11	100.0	H	170.0	-10.2

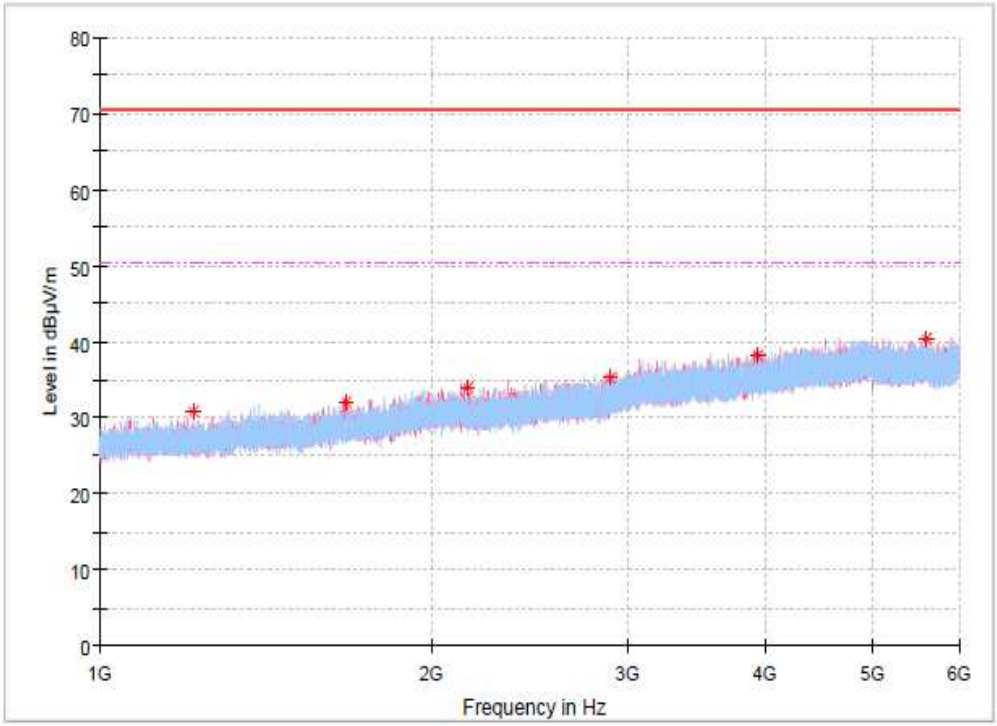
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode5: LTE Band 14 - High CHANNEL 765.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1215.875000	30.86	70.50	39.64	100.0	H	271.0	-11.3
1674.750000	31.99	70.50	38.51	100.0	H	35.0	-8.2
2155.125000	34.12	70.50	36.38	100.0	H	65.0	-6.3
2893.500000	35.35	70.50	35.15	100.0	V	40.0	-3.6
3946.250000	38.06	70.50	32.44	100.0	V	346.0	0.8
5604.125000	40.36	70.50	30.14	100.0	V	260.0	4.2

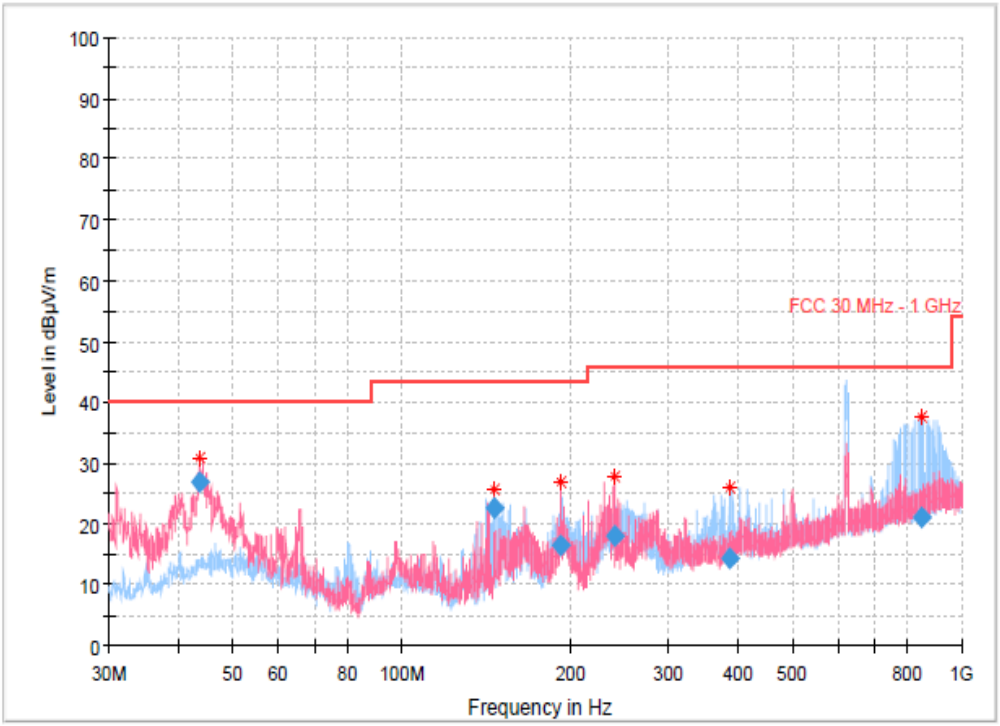
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 788 MHz to 798 MHz and from 758 MHz to 768 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode6: LTE Band 71 - Low CHANNEL 623 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.610500	26.88	40.00	13.12	100.0	V	22.0	-20.0
146.034000	22.48	43.50	21.02	200.0	H	114.0	-25.8
192.030000	16.60	43.50	26.90	100.0	V	255.0	-22.6
240.045000	18.12	46.00	27.88	100.0	V	278.0	-20.7
385.620000	14.35	46.00	31.65	100.0	H	8.0	-17.0
848.431500	20.97	46.00	25.03	100.0	H	196.0	-10.1

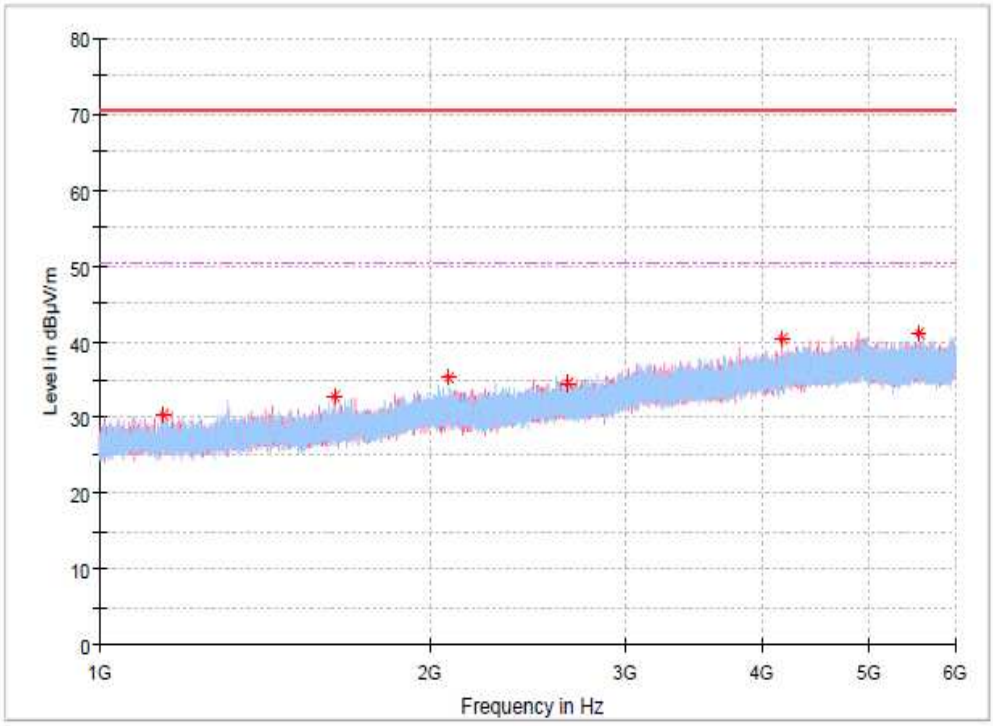
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode6: LTE Band 71 - Low CHANNEL 623 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1143.875000	30.30	70.50	40.20	100.0	H	3.0	-11.6
1634.250000	32.83	70.50	37.67	100.0	V	275.0	-8.3
2074.625000	35.22	70.50	35.28	100.0	H	150.0	-6.1
2663.250000	34.47	70.50	36.03	100.0	V	74.0	-4.1
4181.625000	40.47	70.50	30.03	100.0	V	182.0	1.5
5552.125000	41.05	70.50	29.45	100.0	H	0.0	4.2

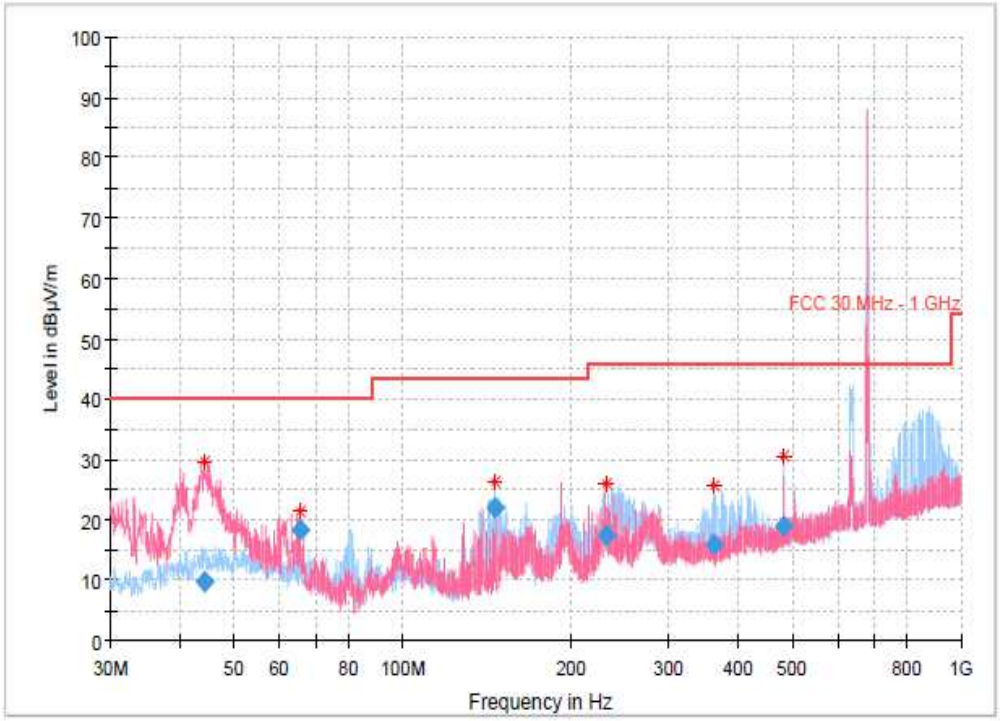
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode6: LTE Band 71 - Middle CHANNEL 634.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.259000	9.86	40.00	30.14	200.0	H	103.0	-19.9
65.445000	18.22	40.00	21.78	100.0	V	315.0	-22.9
146.040000	22.09	43.50	21.41	200.0	H	103.0	-25.8
230.922000	17.39	46.00	28.61	100.0	V	192.0	-21.2
360.114000	16.02	46.00	29.98	100.0	H	128.0	-18.0
479.991500	18.84	46.00	27.16	200.0	H	3.0	-15.2

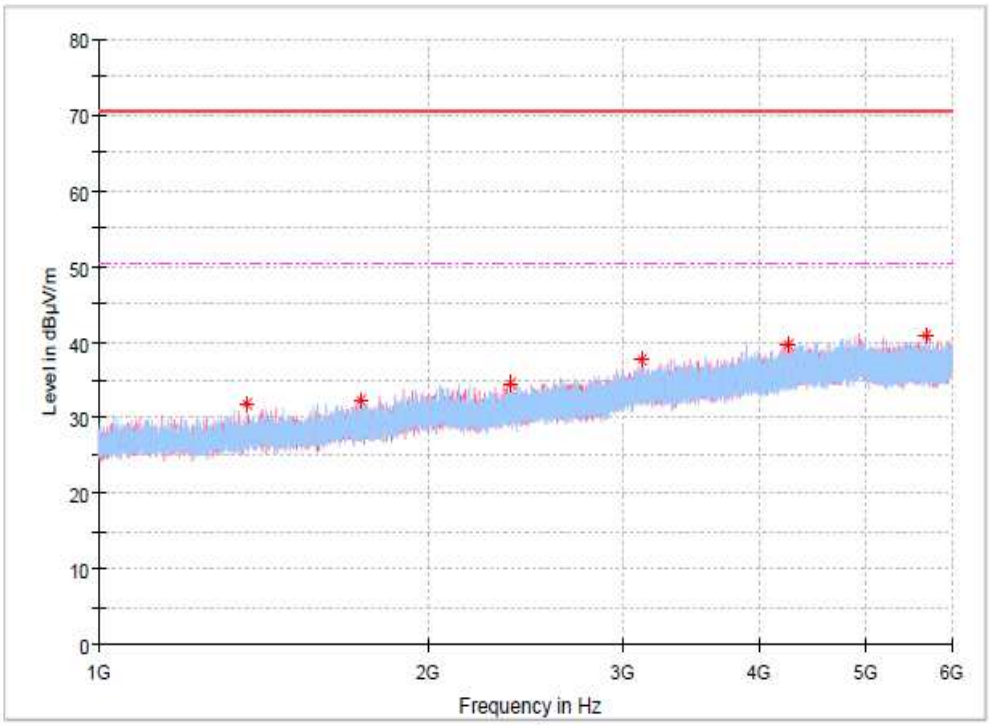
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode6: LTE Band 71 - Middle CHANNEL 634.5 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1363.000000	31.85	70.50	38.65	100.0	H	194.0	-10.0
1735.875000	32.40	70.50	38.10	100.0	V	39.0	-8.1
2376.125000	34.45	70.50	36.05	100.0	V	297.0	-5.3
3126.125000	37.74	70.50	32.76	100.0	H	210.0	-1.6
4251.500000	39.52	70.50	30.98	100.0	H	216.0	1.9
5690.875000	40.74	70.50	29.76	100.0	H	272.0	4.1

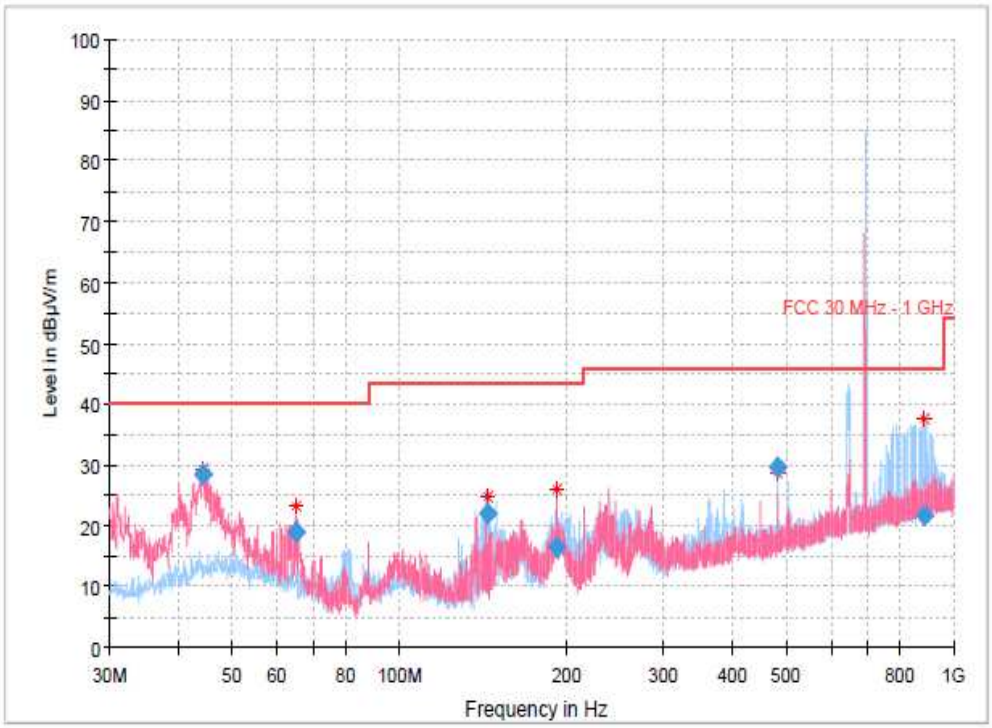
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Below 1 GHz (Mode6: LTE Band 71 - High CHANNEL 647 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Below 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.239500	28.38	40.00	11.62	100.0	V	112.0	-19.9
64.968500	18.93	40.00	21.07	100.0	V	24.0	-22.7
144.513500	22.01	43.50	21.49	200.0	H	86.0	-25.8
191.990000	16.66	43.50	26.84	100.0	V	192.0	-22.6
479.983000	29.71	46.00	16.29	200.0	H	0.0	-15.2
887.052000	21.69	46.00	24.31	100.0	H	189.0	-9.7

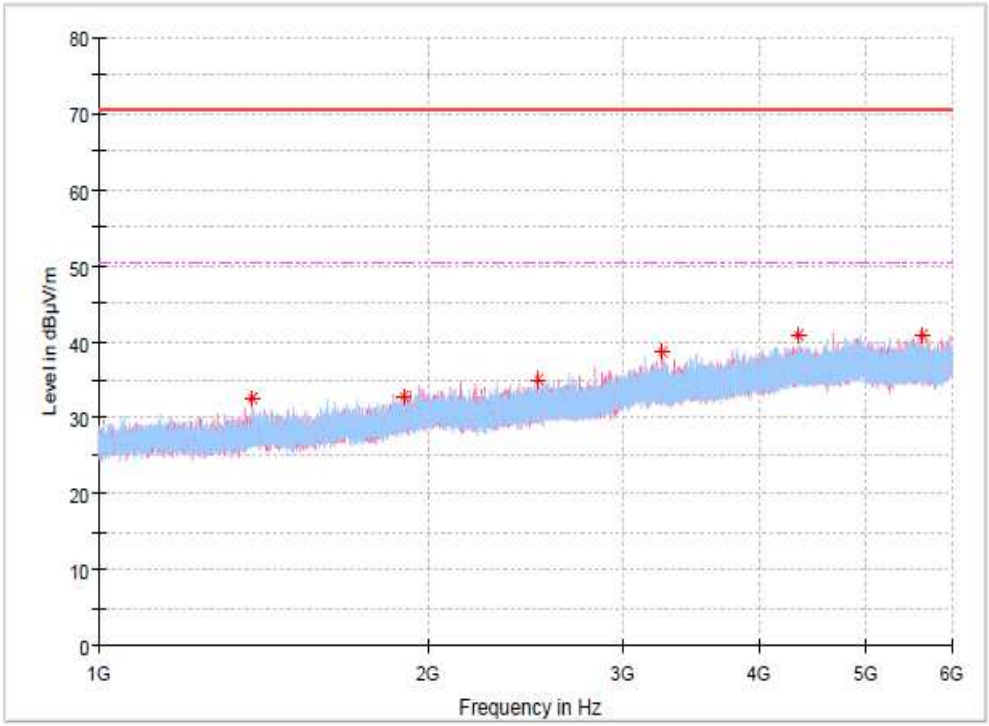
Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.

Above 1 GHz (Mode6: LTE Band 71 - High CHANNEL 647 MHz)

Test Report

Common Information

Project Number	200610K007
Location	10 m SAC
System:	Above 1 GHz
Environment	20.7 'C / 47.3 % R.H. / 100.2 kPa



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1381.250000	32.65	70.50	37.85	100.0	H	46.0	-9.8
1899.250000	32.83	70.50	37.67	100.0	V	192.0	-7.0
2515.125000	35.01	70.50	35.49	100.0	V	216.0	-4.3
3268.250000	38.60	70.50	31.90	100.0	V	31.0	-1.5
4345.875000	40.95	70.50	29.55	100.0	H	180.0	2.2
5646.000000	40.97	70.50	29.53	100.0	V	216.0	4.1

Note1) Two graphs measured for both Vertical and Horizontal of the Antenna are combined into one graph.
Note2) Unwanted emissions captured from 663 MHz to 698 MHz and from 617 MHz to 652 MHz and Harmonics were the TX and RX signals generated from the call-simulator.
Note3) Emission was scanned 1 GHz to 6 GHz; No emissions were detected above the noise floor which was at least 20 dB below the specification limit.

Appendix A. Test site accreditations

Certificate	Nation	Agency	Code	Remark
Accreditation	USA	A2LA	4068.03	31 July, 2019
Accreditation	KOREA	RRA	KR0158	10 January, 2020
Registration	Japan	VCCI	4013	17 February,2020
Accreditation	USA MRA	FCC	KR0158, 666061	17 March, 2020
Accreditation	CANADA MRA	ISED	KR0158, 25944	17 March, 2020
Accreditation	Vietnam MRA	MIC	KR0158	20 April, 2020

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competent of calibration and testing laboratory”.

Appendix B. Test Equipment

Radiated emission					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal. Date**	**Cal. Due**
EMI Test Receiver	R&S	ESW44	101812	2019.03.20	2020.03.20
Trilog Antenna (with 6 dB ATT.)	Schwarzbeck	VULB 9163	01199	2019.04.03	2021.04.03
Horn Antenna	R&S	HF907	102773	2020.02.10	2021.02.10
Signal Conditioning Unit	R&S	SCU08F2	08400016	2019.12.30	2020.12.30
Signal Conditioning Unit	R&S	SCU-18F	180111	2019.12.30	2020.12.30
Signalling Tester	Anritsu	MT8000A	6261949673	2019.12.02	2020.12.02
Signalling Tester	Anritsu	MT8821C	6262025356	2019.11.04	2020.11.04
Wide Band Radio Communication Tester	R&S	CMW500	127578	2020.06.08	2021.06.08
Software	R&S	EMC 32	Ver. 10.35.10	-	-