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Report On

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE
(B11, B18). Dual mode Media Tablet with Bluetooth, WLAN,
NFC(Type-A/ B) and GPS
In accordance with FCC CFR 47 Part 15B

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FCC ID: APYHRO00179

Document 75919259 Report 07 Issue 1

November 2012



Product Service

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REPORT ON

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Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE
(B11, B18). Dual mode Media Tablet with Bluetooth, WLAN,
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Document 75919259 Report 07 Issue 1

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PREPARED FOR

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APPROVED BY

Mark Jenkins
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DATED

09 November 2012

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler



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SECTION 1

REPORT SUMMARY

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode
Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS.
In accordance with FCC CFR 47 Part 15B



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS. to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sharp Corporation
Model Number(s)	CDMA SHT21
Serial Number(s)	IMEI 004401114403823
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B (2011)
Incoming Release Date	Application Form 11 October 2012
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	9385 24 October 2012
Start of Test	23 October 2012
Finish of Test	31 October 2012
Name of Engineer(s)	G Lawler



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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15B is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
AC Powered/USB				
2.1	15.107	AC Line Conducted Emissions	Pass	
2.2	15.109	Radiated Emissions	Pass	



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1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	CDMA SHT21
Part Number	
FCC ID (if applicable)	APYHRO00179
Industry Canada ID (if applicable)	
Technical Description (Please provide a brief description of the intended use of the equipment)	Dual-Band CDMA(800MHz_BC0, 1900MHz_BC6) and Dual-band LTE(1.5GHz_B11, 800MHz_B18) Dual Mode Cellular Phone with Bluetooth, W-LAN, NFC and GPS receiver enabled.

EXTREME TEMPERATURE RANGE over which the equipment is to be type tested	
☐	-20°C to +55°C
☒	Other (2)
☐	Not applicable (no extreme temperature testing required)
Extreme temperature range for the host(s): -10C to +55C	

(2) The equipment shall be tested over the following temperature ranges :

- a) 0°C to +35°C for equipment for indoor use only, or intended for used in areas where the temperature is controlled within this range.
- b) Over the extremes of the temperature range(s) of the declared host equipment(s) in case of plug-in radio devices.

TYPE OF ANTENNA	
☒	Integral
Temporary RF connector provided: ☒ Yes ☐ No	
☐	Antenna connector
☐	Number of antenna assembly(ies) submitted
Gain of the antenna intended for normal use:	
2	dBi for assembly identified as Bluetooth
2	dBi for assembly identified as WLAN
	dBi for assembly identified as
	dBi for assembly identified as
	dBi for assembly identified as

TRANSMITTER TECHNICAL CHARACTERISTICS		
TRANSMITTER OPERATING FREQUENCY RANGE(S)		
	FCC and/or Industry Canada	EU
Bluetooth	2402 to 2480 MHz	2402 to 2480 MHz
WLAN	2412 to 2462 MHz	2412 to 2472 MHz
FCC and/or Industry Canada (only)		
Highest Internally Generated Frequency 1512.0 MHz		



SPREAD SPECTRUM PARAMETERS			
☒ Bluetooth			
FHSS:	Channel ☒ 79 Other	EDR	☒ Yes ☐ No
Medium Access Protocol (Customer Declaration)			
"We have implemented Bluetooth protocol which satisfies the medium access protocol requirement of EN 300 328".			
☒ WLAN			
IEEE 802.11(b) – DSSS ☒			
IEEE 802.11(g) – OFDM ☒			
IEEE 802.11(n) – OFDM ☒			
Supported Spatial Streams		2.4 GHz	5GHz
Transmitter (Tx)		Yes	Yes
Receiver (Rx)		Yes	Yes
GI (Guard Interval) ☒ 800 ns ☐ 400 ns			
Band Width ☒ 20 MHz ☒ 40 MHz			
☐ Other Technology			
Direct Sequence ☐ Frequency Hopping ☐ Combined ☐ Other			
DSSS	Chip Sequence Length		bit
	Spectrum Width		MHz
FHSS	Total Number of Hops		
	Dwell Time		ms
	Bandwidth Per Hop		MHz
	Maximum Separation of Hops		MHz for ETSI EN 300 328
Other			
Medium Access Protocol (Customer Declaration)			
"We have implemented IEEE 802.11 (b/g/n) protocol which satisfies the medium access protocol requirement of EN 300 328".			



TRANSMITTER POWER CHARACTERISTICS				
Bluetooth				
Maximum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)	0.004	W		
Effective radiated power (for equipment with integral antenna)	0.004	W		
Minimum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)	0.0003	W		
Effective radiated power (for equipment with integral antenna)	0.0003	W		
Is transmitter intended for :				
Continuous duty	☒	Yes	☐	No
Intermittent duty	☐	Yes	☒	No
If intermittent state DUTY CYCLE				
Transmitter ON	seconds	Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?		☒	Yes	☐ No
Is transmitter output power variable:		☐	Yes	☒ No
State during the test:				
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds
Duty cycle (Tx on /(Tx on +Tx off))		%		
☐ Continuously variable		☐ Stepped		
dB per step				
WLAN				
Maximum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)	b;0.05 (g.n;0.302)	W		
Effective radiated power (for equipment with integral antenna)	b;0.05 (g.n;0.032)	W		
Minimum Rated Transmitter Output				
Effective radiated power (for equipment with antenna connector)		W		
Effective radiated power (for equipment with integral antenna)		W		
Is transmitter intended for :				
Continuous duty	☒	Yes	☐	No
Intermittent duty	☐	Yes	☐	No
If intermittent state DUTY CYCLE				
Transmitter ON	seconds	Transmitter OFF	minutes	
Is continuous operation possible for testing purposes?		☒	Yes	☐ No
Is transmitter output power variable:		☐	Yes	☒ No
State during the test:				
Transmitter duty cycle	Tx on	Seconds	Tx Off	Seconds
Duty cycle (Tx on /(Tx on +Tx off))		%		
☐ Continuously variable		☐ Stepped		
dB per step				

☐ Does not apply

AUTOMATIC EQUIPMENT SWITCH OFF	
If the equipment is designed to automatically switch off at a predetermined voltage level which is higher or lower in value than the battery minimum and minimum calculated values this shall be clearly stated.	
☐ Applies	V cut-off voltage
☐ Does not apply	

Signature:  Name: Mototsugu Moroi
Position held: Manager Date: 11th October, 2012



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS.. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 4.0 V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard or test plan were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



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SECTION 2

TEST DETAILS

FCC Testing of the
Sharp CDMA SHT21 Dual-band CDMA (BC0, BC6) & Dual-band LTE (B11, B18). Dual mode
Media Tablet with Bluetooth, WLAN, NFC(Type-A/ B) and GPS.
In accordance with FCC CFR 47 Part 15B



2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.107

2.1.2 Equipment Under Test and Modification State

CDMA SHT21 S/N: IMEI 004401114403823 - Modification State 0

2.1.3 Date of Test

31 October 2012

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The EUT is set up on a test table 800mm above a horizontal ground plane. A vertical ground plane is also required and is placed 400mm from the EUT. Where a EUT is floor standing it will be stood on but insulated from the ground plane by up to 12mm.

The EUT is powered through a Line Impedance Stabilisation Network (LISN) which is bonded to the ground plane. The EUT is located so that the distance between the EUT and the LISN is no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN is 1m. Where this is not possible the cable is non inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions is obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver is tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9kHz Video and Resolution Bandwidth.

2.1.6 Environmental Conditions

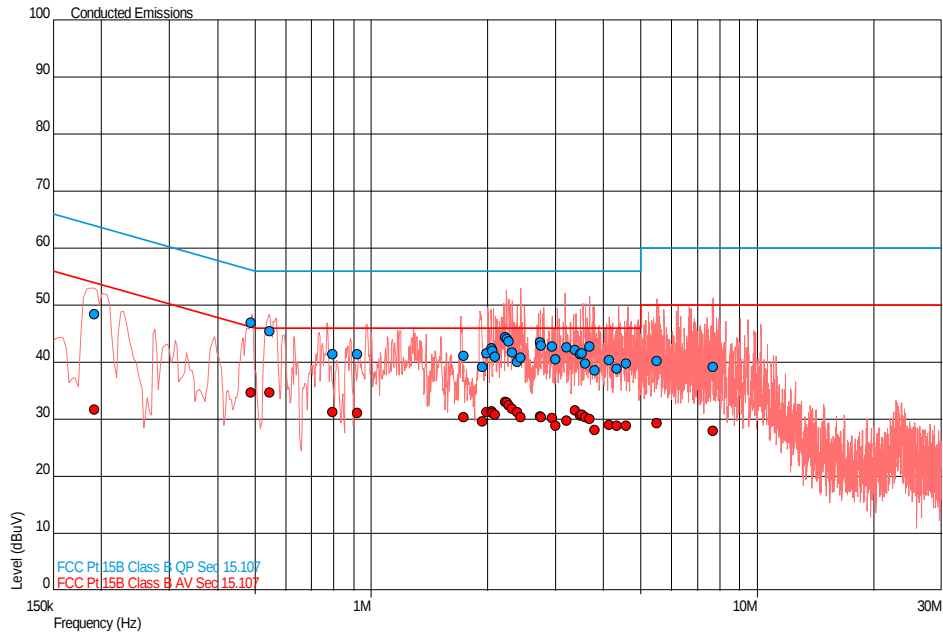
Ambient Temperature	21.5°C
Relative Humidity	36.0%



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2.1.7 Test Results

Live Line



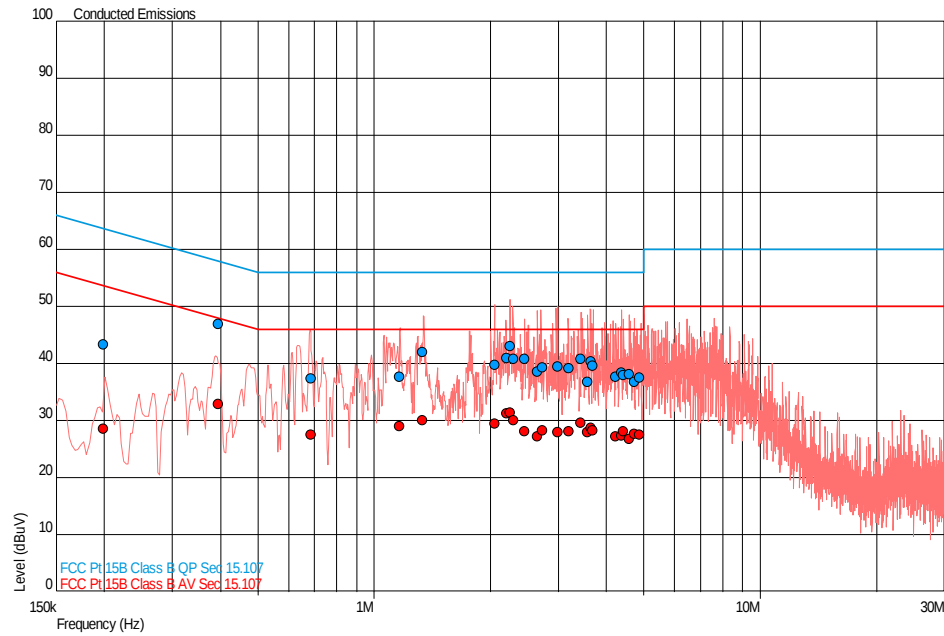


Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.192	48.5	63.9	-15.5	31.8	53.9	-22.2
0.488	46.9	56.2	-9.3	34.6	46.2	-11.6
0.545	45.5	56.0	-10.5	34.7	46.0	-11.3
0.794	41.4	56.0	-14.6	31.2	46.0	-14.8
0.922	41.4	56.0	-14.6	31.1	46.0	-14.9
1.732	41.1	56.0	-14.9	30.4	46.0	-15.6
1.937	39.1	56.0	-16.9	29.7	46.0	-16.3
1.996	41.6	56.0	-14.4	31.3	46.0	-14.7
2.054	42.5	56.0	-13.5	31.4	46.0	-14.6
2.067	41.9	56.0	-14.1	31.1	46.0	-14.9
2.099	40.9	56.0	-15.1	30.9	46.0	-15.1
2.227	44.4	56.0	-11.6	33.0	46.0	-13.0
2.245	44.1	56.0	-11.9	32.9	46.0	-13.1
2.277	43.6	56.0	-12.4	32.5	46.0	-13.5
2.318	41.7	56.0	-14.3	31.8	46.0	-14.2
2.386	40.1	56.0	-15.9	31.2	46.0	-14.8
2.439	40.8	56.0	-15.2	30.3	46.0	-15.7
2.748	43.5	56.0	-12.5	30.6	46.0	-15.4
2.752	42.9	56.0	-13.1	30.3	46.0	-15.7
2.944	42.7	56.0	-13.3	30.2	46.0	-15.8
3.002	40.5	56.0	-15.5	28.9	46.0	-17.1
3.213	42.6	56.0	-13.4	29.8	46.0	-16.2
3.369	42.1	56.0	-13.9	31.6	46.0	-14.4
3.479	41.4	56.0	-14.6	30.7	46.0	-15.3
3.518	41.6	56.0	-14.4	30.9	46.0	-15.1
3.586	39.8	56.0	-16.2	30.3	46.0	-15.7
3.676	42.7	56.0	-13.3	30.1	46.0	-15.9
3.791	38.6	56.0	-17.4	28.1	46.0	-17.9
4.135	40.4	56.0	-15.6	29.0	46.0	-17.0
4.331	38.9	56.0	-17.1	28.9	46.0	-17.1
4.586	39.7	56.0	-16.3	28.9	46.0	-17.1
5.498	40.2	60.0	-19.8	29.3	50.0	-20.7
7.662	39.2	60.0	-20.8	28.0	50.0	-22.0



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Neutral Line





Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (dBμV)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.199	43.4	63.7	-20.3	28.6	53.7	-25.1
0.394	47.0	58.0	-11.0	32.9	48.0	-15.1
0.684	37.4	56.0	-18.6	27.5	46.0	-18.5
1.164	37.7	56.0	-18.3	29.0	46.0	-17.0
1.335	42.1	56.0	-13.9	30.1	46.0	-15.9
2.051	39.7	56.0	-16.3	29.4	46.0	-16.6
2.200	41.0	56.0	-15.0	31.2	46.0	-14.8
2.249	43.0	56.0	-13.0	31.5	46.0	-14.5
2.293	40.8	56.0	-15.2	30.1	46.0	-15.9
2.454	40.8	56.0	-15.2	28.1	46.0	-17.9
2.650	38.6	56.0	-17.4	27.2	46.0	-18.8
2.721	39.4	56.0	-16.6	28.3	46.0	-17.7
2.982	39.5	56.0	-16.5	27.9	46.0	-18.1
3.195	39.2	56.0	-16.8	28.2	46.0	-17.8
3.431	40.8	56.0	-15.2	29.6	46.0	-16.4
3.577	36.9	56.0	-19.1	28.0	46.0	-18.0
3.634	40.4	56.0	-15.6	28.7	46.0	-17.3
3.681	39.7	56.0	-16.3	28.2	46.0	-17.8
4.223	37.7	56.0	-18.3	27.2	46.0	-18.8
4.380	38.4	56.0	-17.6	27.4	46.0	-18.6
4.407	38.1	56.0	-17.9	28.2	46.0	-17.8
4.577	38.1	56.0	-17.9	26.9	46.0	-19.1
4.707	36.8	56.0	-19.2	27.7	46.0	-18.3
4.859	37.5	56.0	-18.5	27.5	46.0	-18.5



2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109

2.2.2 Equipment Under Test and Modification State

CDMA SHT21 S/N: IMEI 004401114403823 - Modification State 0

2.2.3 Date of Test

23 October 2012

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions is obtained up to the 5th harmonic of the EUT's highest internally generated fundamental frequency. For frequencies from 30MHz to 18GHz the EUT is placed on a test table 800mm above the ground plane. For frequencies above 18GHz, the EUT height is increased by 200mm to a height of 1000mm. This is to ensure the beam width of the measuring antenna gives sufficient vertical coverage of the EUT.

During characterisation the turntable azimuth is adjusted from 0 to 360 degrees with the measuring antenna in one polarity. It is then repeated for the other polarity. Any frequencies of interest are noted for formal measuring later. The distance from the measuring antenna to the boundary of the EUT is 3m. Above 18GHz this distance may be reduced to 1m.

During formal measurement the spectrum analyser is tuned to the frequency of the emission. The turntable azimuth is adjusted from 0 to 360 degrees to determine the point at which the maximum emission level occurs. Then the height of the measuring antenna is adjusted from a height of 1m to 4m to determine the height at which the maximum emission level occurs. Once the point of maximum emission has been determined the emission is measured. Emissions in the 30MHz to 1GHz range are measured using a CISPR Quasi – Peak detector function in a 120kHz bandwidth. Emissions in the range 1GHz to 40GHz require Peak and Average measurements. The Peak measurements are made using a peak detector with 1MHz Resolution and Video bandwidths. The average measurements employ a peak detector with a Resolution bandwidth of 1MHz and a Video bandwidth of 10Hz. If measurements are made at a 1m measuring distance, then 10dB is added to the specification limit.

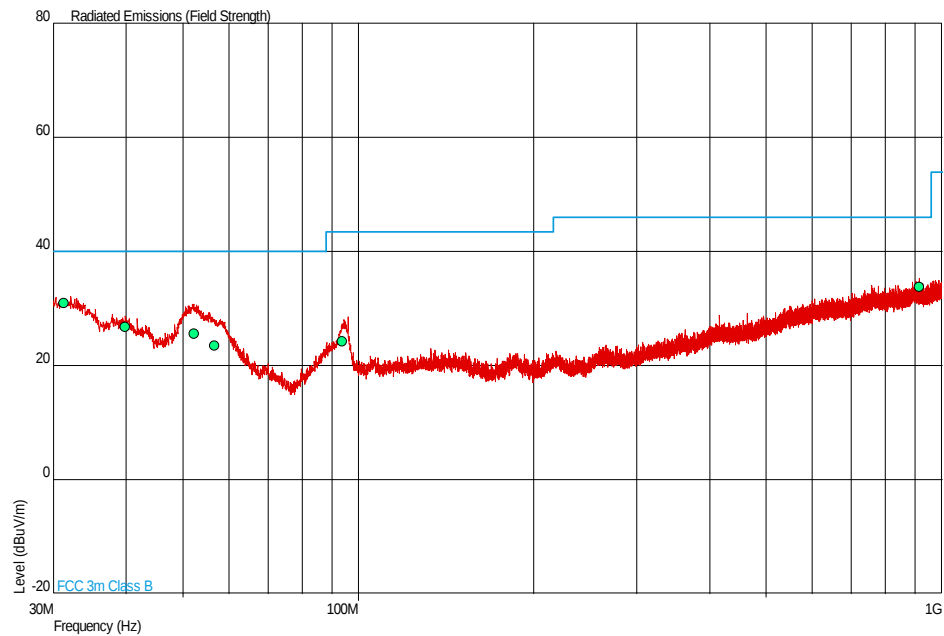
2.2.6 Environmental Conditions

Ambient Temperature	22.2°C
Relative Humidity	49.0%



2.2.7 Test Results

30 MHz to 1 GHz

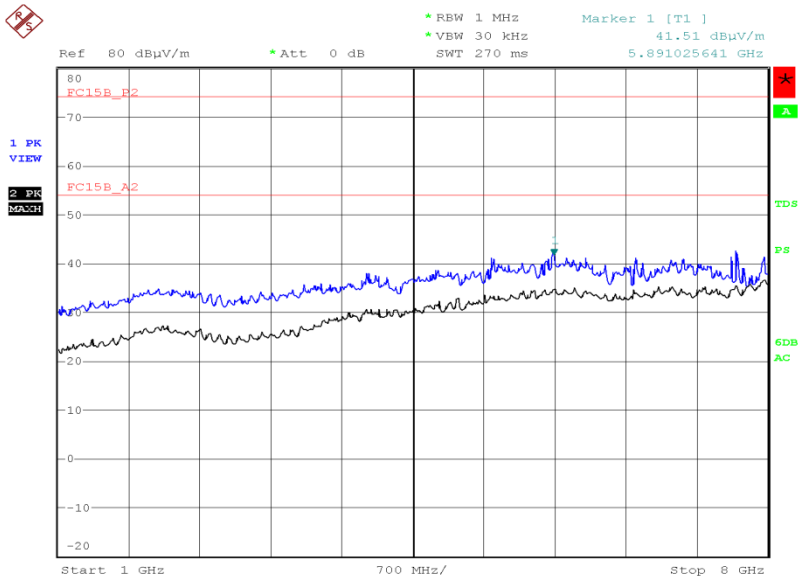


Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
31.333	30.9	35.1	40.0	100	-9.1	64.9	252	1.00	Vertical
39.854	26.8	21.9	40.0	100	-13.2	78.1	328	1.00	Vertical
52.306	25.6	19.1	40.0	100	-14.4	80.9	352	1.00	Vertical
56.770	23.6	15.1	40.0	100	-16.4	84.9	317	1.00	Vertical
93.903	24.2	16.2	43.5	150	-19.3	133.8	83	1.15	Vertical
913.960	33.8	49.0	46.0	200	-12.2	151.0	66	1.00	Vertical



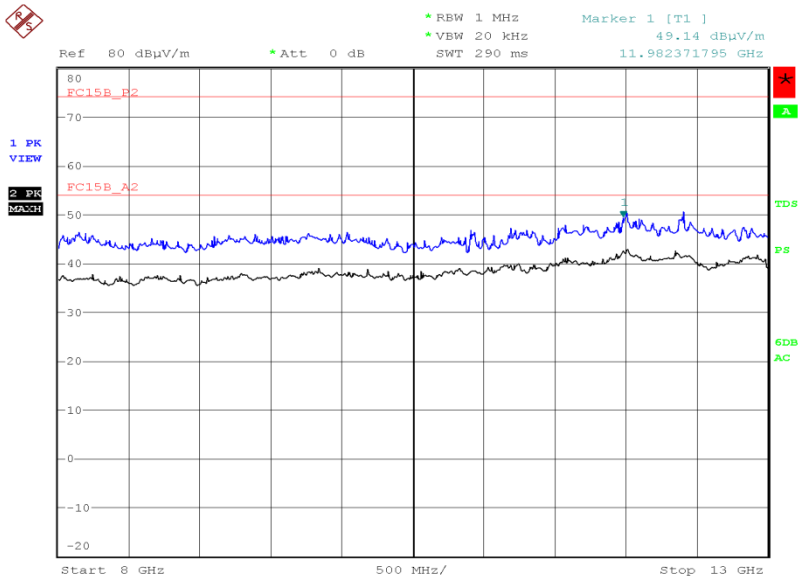
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1 GHz to 8 GHz



Date: 23.OCT.2012 21:01:27

8 GHz to 13 GHz



Date: 23.OCT.2012 21:07:20



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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- AC Line Conducted Emissions					
LISN (1 Phase)	Chase	MN 2050	336	12	23-Mar-2013
Transient Limiter	Hewlett Packard	11947A	1032	12	28-Jun-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Radiated Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	13-Sep-2013
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	14-Nov-2012
Filter (High Pass)	Lorch	SHP7-7000-SR	566	12	20-Feb-2013
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Pre-Amplifier	Phase One	PS04-0087	1534	12	28-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Test Receiver	Rohde & Schwarz	ESIB40	1934	12	25-Oct-2012
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Signal Generator: 10MHz to 20GHz	Rohde & Schwarz	SMR20	3475	12	20-Dec-2012
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	16-Apr-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	25-Oct-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	15-Oct-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Low Noise Amplifier	Wright Technologies	APS04-0085	3969	-	TU

TU – Traceability Unscheduled



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3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Radiated Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB
AC Line Conducted Emissions	± 3.2 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
(Not UKAS Accredited).

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